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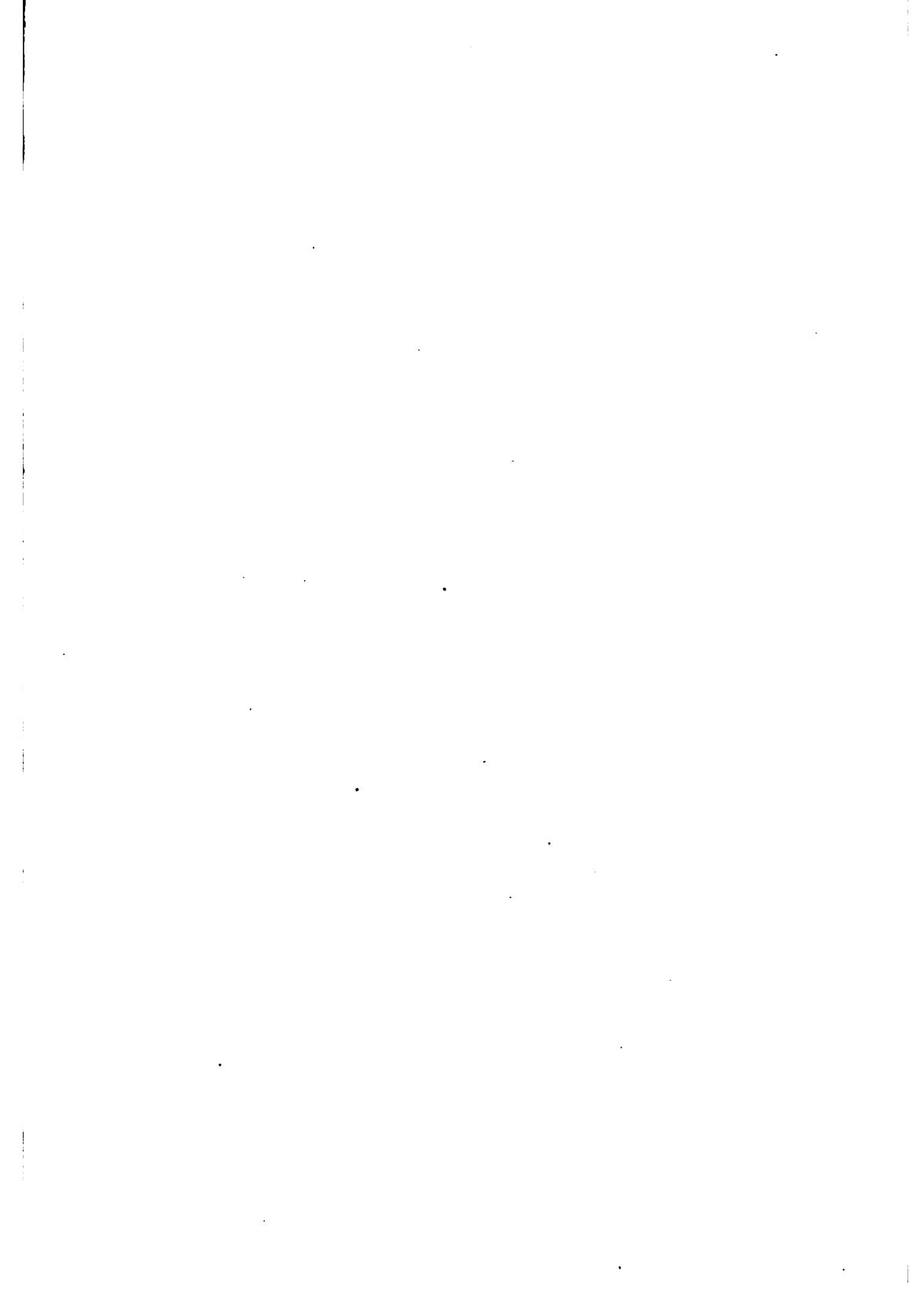
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GOOD ROADS.

*An Illustrated Monthly Magazine, Devoted to the
Improvement of the Public Roads
and Streets.*

VOLUME ONE,
JANUARY TO JUNE, 1892.

Published by the
ROADS IMPROVEMENT BUREAU OF THE LEAGUE OF AMERICAN WHEELMEN,
Potter Building, New York.

Sept 1892
EX. 194

1892, Sept 23.

Oct 1-6.

Sept 23
Chas. C. Carr.

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BY

THE LEAGUE OF AMERICAN WHEELMEN.

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UNDERSTAND ANY AGE
OR PEOPLE. IF THEY
HAVE NO ROADS THEY
ARE SAVAGES FOR
THEIR ROAD IS THE
CREATION OF MAN
AND A TYPE OF
CIVILIZED
SOCIETY."

VOL. I.

❖ JANUARY, 1892 ❖

NO. 1.

An illustrated monthly
magazine devoted to
the improvement
of the public roads
and streets



"The common roads of the
United States have been neg-
lected, and are inferior to those
of any other civilized country
in the world."—U. S. Com-
missioner of Agriculture

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THE EDITOR'S TABLE.

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NEWS AND COMMENT.

BORROWED WIT.



ISAAC B. POTTER

Managing Editor

PUBLICATION OFFICE
POTTER BUILDING NEW YORK

PUBLISHED

BY THE

LEAGUE FOR ROAD IMPROVEMENT BUREAU

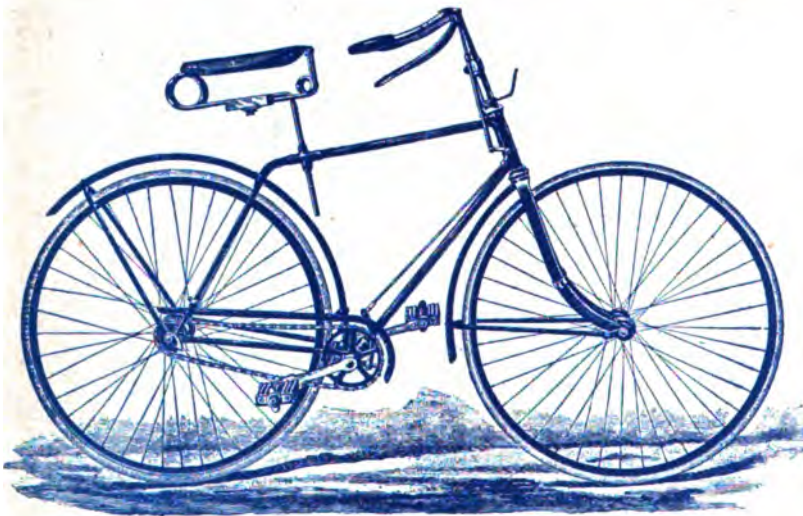


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Each monthly number of **Good Roads** will be illustrated by pictures carefully prepared to accompany the text and designed to illustrate with special force the value of

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The general aim of this magazine will be to stimulate the interest of the public concerning the advantages of good roads and streets, and the best **methods of constructing and maintaining them.** In pursuance of this object we shall publish from time to time the

Best Articles Obtainable

relating not only to the economic features of the movement, but showing also by both text and illustration, the **MOST APPROVED METHODS** of improving the public streets and roads.



GOOD ROADS.

Vol. I.

JANUARY, 1892.

No. I.

THE GOSPEL OF GOOD ROADS.

BY ISAAC B. POTTER.



A COUNTRY ROAD IN FRANCE.

INTRODUCTION.



HAVE heard of a very clever woman whose otherwise excellent husband disturbed the felicity of the household about twice in each year by making himself very drunk. The good wife, despairing of the common and commonly hopeless remedy of moral suasion, applied her wits to the discovery of a newer and more effective means of appealing from Philip drunk to Philip sober. On the occasion of his next debauch, when he was brought home in a condition of maudlin helplessness, with clothing smeared and torn, eyes bleared and face inflamed by drink, she sent for the photographer and caused a life-size picture of her limp lord to be taken, which was duly finished in appropriate colors, framed and hung in a place of honor in the family reception room, where she insisted upon keeping it for a period of three months, and

made known her vow to double the term whenever the offense should be repeated. That picture was a silent and successful preacher.

It has seemed to me that if national errors could be reflected in the same forcible way ; if some power could and would

"the giftie gie us,
to see ourselves as others see us,"

we should get to the end of many of our difficulties. The dirt roads of America are heavy drinkers. They lead a staggering and uncertain course from town to town ; smear themselves with thick mire ; for four months in the year are unfit for the company of respectable people, and less than eighteen months ago got themselves regularly indicted by the grand jury.* The pictures of roads shown in the following article are made from photographs. Like all truthful pictures they are better than words, and if they shall supply force to the imperfect work which I have put together in the odd moments picked from the hours of an exacting profession, I shall feel that I am doubly paid for my trouble, that the pictures themselves are a sufficient reason for their existence, and shall owe an abundant gratitude to the friends by whose aid they have been obtained. I. B. P.

I.

To the American Farmer:

In these days, when the voice of your complaint is loud in the land, and a thousand partisans are declaiming a thousand theories to account for the "decline of agriculture," I will try to write you a letter, in which, I believe, I can make it appear that the greatest remedy for the cure of unprofitable farming lies in your own hands.

It is a thankless, unpopular, and, in some respects, a discouraging thing to preach reform, and the man who undertakes it for your benefit is entitled to your everlasting regard. I am going to make that claim upon you, and you will be more ready to square the account when you know that I am opposed to high taxes, and to the placing of undue burdens upon the farmer, and that I am only trying to show you a way for the enrichment of your slender purse and the betterment of your condition.

The man who lives on a farm should be happier for every association of farm life. It is a splendid thing to breathe pure air, drink pure water and have a hundred acres of elbow-room.

* On January 14, 1889, the grand jury of Union County, N. J., came into court with a formal presentment against the old roads ; declaring that "public interests demand that these roads be repaired and put in good condition at once."

Another thing, every farming community is a community of homes. You have something to be proud of in that. It broadens your manhood and makes you know you have a sacred spot to love and defend. It makes you a good citizen, and a tender husband and father. I wouldn't give much for the patriotism of a man whose only interest in the nation can be packed in a carpet bag. He is not the man for the times when his country is in peril, and when the air trembles with the noise of battle you will find the great bulwark of defense to be made up of volunteers from the farms and firesides. Most great men have been born in the country, and no child of genius ever yet thrived in a boarding-house. The great and successful government is always a government of homes.

And I want to acknowledge the importance and grandeur of your vocation. It is the prime source of all national wealth, and, under proper conditions, it should make you the happiest and most independent of mortals. By the fruits of your toil humanity is sustained, and to reward your industry the coffers of the world are open.

But these are the incidents of your calling. Personally you inherit the common foibles of the race, and you are not aloof from the errors nor exempt from the misfortunes which beset us all. In all kindness let me remind you that in other years you and your good neighbors have opposed many great improvements which were intended for our common benefit, and which the lapse of time has placed in the highest niches of human advancement. You do not forget that when the first railroads were projected you appeared before the legislature of your state and opposed the granting of franchises to all such iniquitous schemes. You said that the locomotives would burn your crops and set fire to the wool on the backs of your sheep; that the gases from the smoke stack would poison your family and your farm stock, and that travel in a railroad car at the frightful speed of twenty miles an hour would be fatal to many passengers and dangerous to all. You opposed the telegraph and ridiculed the mowing machine. You took the sewing machine on sufferance and regarded the patent thresher with a suspicious eye; and I might almost say there is no great invention of commercial or agricultural value which was cheered at its birth by the warmth of your approval.

It is best that I should remind you of these things. I do it without malice, for I am somewhat of a farmer myself, and in this most friendly communication it is best that we begin with the frank understanding on all sides that, in spite of your great intelligence, events have proven that, like the rest of mankind, you are likely to err. We don't always recognize a good thing at first sight.

You have changed your opinions about many things because you did not at first understand their value. Observation, argument and experience have helped you out of many an error ; and I am sure you will pardon me if I suggest that you have never yet learned the value of a good road ; for upon this subject you have had neither observation nor experience, and without these, argument is certain to go astray. Let me remind you by one or two illustrations taken from your personal history.

The scythe and the flail are no longer the best tools of your trade, and you long since ceased to shoot crows with the old flint-lock. A few years ago one of your venturesome neighbors went to the state fair and brought home a patent reaper. A little later an enterprising drummer sold him a thresher and a fanning mill. He was a brainy neighbor, with plenty of nerve and a confidence in his own judgment, and you profited by his experience. You looked over the fence while he was at work and became satisfied that the old way of doing things involved an extravagant waste of time and labor ; and you soon found that the money spent for farming machinery was well invested. Then they ran a line of railroad up through your county, and after a while you discovered that it was cheaper and vastly quicker to ride on the cars than to go long journeys by the common road ; and you have been on tolerably good terms with that railroad ever since.

Each of these splendid improvements has filled a want. Proving first its usefulness and then its necessity, it has found a market. You cannot half succeed without it. Did you ever think how it was that all these labor-saving things were first brought to your attention ? They were not born in a public institution nor invented by a public officer—not one of them ; they were not put in use by the vote of a town meeting nor by proclamation of the governor ; they are no part of the public business, and in bestowing their benefits they have been careful to avoid the sluggish turn of the public mill. It all came about in quite a different

way. Do you remember how you first came to buy a mower? A wide-awake Yankee told you that he had a machine for cutting grass by horse-power; that this machine would do better and cleaner work than your scythe, and that, too, at the rate of an acre an hour. You said "Nonsense!" He took his mower down into your meadow, and in a good-natured way proved to you that you could save money in buying that machine; that you had been paying too much for hired help and boarding too many extra hands in harvest time. You bought that mower, and though you paid what seemed a round figure, you now know that it has paid for itself many times over.

And so you see at the outset, that the mower was rather forced upon you, as were the horse-rake and the reaper and all the rest of the splendid things in the category of farming machinery. You have taxed yourself to pay for these improvements. There is no philanthropy in trade, and you have paid cost and profit to the manufacturer till he has grown rich in the business; but on the other side of the account it appears that the millions of money spent by the farmers of the United States for improved machines have been repaid to them a hundred fold by the saving of time, labor and money which the old methods would have entailed. You have shared benefits and divided profits with the manufacturer, and your money has gone unbewailed to pay for a splendid thing. Your tax has turned out to be an investment, and in the year 1880 you had over four hundred millions of dollars invested in farm implements and machinery.

But I began with the intention of writing to you about roads—the common road that leads from your door-yard to the nearest market. Did it ever occur to you that this road is part of the machinery of agriculture? That your farm wagon is a machine, pure and simple, and that the road bears the same relation to your wagon that the steel rail bears to the railway car? It will do you no harm to think of this a moment, and to remember that every great improvement is the child of thought. The head will ever guide the hand, and every splendid thing you ever did was born and bred in your brain. When the people think, the nation moves; and a government of sluggards is next door to a government of slaves.

If I could be sure that your strong sense would be put to work in the settling of this question of better roads, my letter to

you might stop right here ; but I know that your thoughts are every day directed in the channel where flows the tide of your personal affairs, and in these times of fierce competition you have little to give to the settlement of public questions. You have taken things as you have found them, and long use of dirt roads has almost persuaded you that they are good enough. You are a victim of the ensnaring wiles of custom. "Custom," says Montaigne, "is a violent and treacherous school-mistress. She,



by little and little, slyly and unperceived, slips in the foot of her authority ; but having, by this gentle and humble beginning, with the aid of time, fixed and established it, she then unmask a furious and tyrannic countenance, against which we have no more the courage nor the power so much as to lift our eyes."

I have no axe to grind and have nothing to sell you ; but I want you, as an old friend, to give to this question of good roads the same thought that worked your brain when you bought the mower, for I am going to say some surprising things to you about the country roads, and we shall get on immensely better if

we agree about the facts. And I am going to try to steer clear of theory ; for the road question is far and away the most important one of the American farmer to-day, and when we talk about roads it is best to bear in mind that one fact is worth a gross of guesses, and to apply that scriptural rule, which is no less good in material than in moral things : " Prove all things ; hold fast that which is good."

II.

You will agree with me that your roads are bad. You may not know that they are the very worst in the world ; but you have never seen nor heard of worse ones ; nor, alas, perhaps of better. You live on the main road in an important county. I saw you one day last spring trying to drive your best horse through the pasty depths of that mysterious streak of public territory, and while the patient beast was pulling the harness in two, in his efforts to lift you and your scant load on to the little bridge near the mill, your photograph was taken, and I have had it copied on page 6 of this magazine.

It is an honest picture—as honest as the sun ; let us sit down together and look at it. You will notice that your face is turned the other way, and I promise not to tell anybody who you are ; for I feel that the day is soon coming when every American farmer will look upon that picture with some regret, and I have no desire to humiliate a friend ; besides, it is not your fault alone that this road is bad, nor is it this road alone that presents a sea of slush and slime throughout each rainy season.

There were 10,000 farm horses in your county on the day when this photograph was taken, and for about four weeks all the county roads had been in just this condition. Teaming was out of the question ; to haul a load to town was impossible, and the 10,000 farm horses stood in their stalls " eating their heads off." At what cost to the farmers ? Assume that the cost of keeping each horse is twenty-five cents per day, including labor, food, and all other items, and in half a minute we compute that it costs \$2,500 per day, \$17,500 per week, and exactly \$70,000 for the four weeks that these horses have been standing practically idle. A bad road, you see, is an expensive thing.

It is expensive not alone to the farmers of your county, but to the farmers of the entire country. The average rain-fall in the

United States is something over 40 inches per year. The dirt road absorbs these 40 odd inches of water, freezes and thaws, dries, pulverizes, changes from paste to powder and back again from powder to paste, and for weeks at a time is practically impassable. Farm traffic is tied up. You have produce to sell, purchases to make, grain to grind, timber to haul, bills to collect and obligations to meet, but all these must wait because your only avenue of travel is taking its annual soak. A dozen times a day you look out of your barn door with the hope of seeing some struggling vagrant of whom you can inquire, "How is the road?"

I do not intend to overdraw the picture, for we have agreed together to stick to facts alone, and so I have traveled many miles and gone to much trouble in order that my letter to you might contain only the truth, and I find the country roads to be even worse than I had supposed them to be; worse than you think them to be. They are disgracefully bad almost without exception. One day I said to myself: "Now, there is the great Empire State; she is out of debt, rich, populous, thriving; she has 125 people for every square mile of her territory, nearly 200 incorporated cities and villages, and the value of her farm crops last year was about one and one-half times that of all the New England States combined. I will go up to the capital county of this great State and see what sort of roads New York has provided for her farmers." So, one day in April a year ago, I went to Albany, and there, almost in the shadow of that magnificent \$25,000,000 state house, I found the farmers of Albany County literally struggling in a "slough of despond." Here is a picture from an actual sketch made at that time.



Another perfectly honest picture; as honest as the sun. How much do you suppose it costs the farmers of Albany County per day to keep the roads in that condition? The Legislature was then in session, making laws "for the better government of the City of New York," "for the expenditure of money in the repair of State canals," "for improvement of navigation in the Hudson River," "for the completion of the State Capitol," "for the maintenance of convicts in the State Prison," and so on, millions for expenses without end, but nothing in behalf of the farmer. I bought an Albany morning newspaper, and found in that a somewhat extended article on the condition of the roads in the State of New York. Let me quote: *

**FARMERS BLOCKED OUT—BAD ROADS KEEP RURAL BUSINESS AT A STAND-
STILL—GRAIN FED TO CATTLE WHOLE BECAUSE IT CANNOT
BE TAKEN TO THE MILL.**

* * * * *

Through correspondence from this and vicinity counties it has been learned that the roads have, during months past, been almost impassable. Business has been impeded, farmers unable to forward produce, and trade in general debarred.

* * * * *

The roads in the vicinity of Castleton are in such a shape that it is impossible for farmers to get into the village at all, and business is what may be termed at a standstill. Outside the villages the condition of the roads is by far worse than in former years.

BUSINESS AT A STANDSTILL.

On account of the rough ruts and the very muddy condition of the roads near Guilderland Centre, which are in the worst condition known in years, farmers find it extremely difficult to reach the market with their produce, in consequence of which business has, for some time back, been very dull in this section.

Farmers found it uphill work to raise money enough to pay taxes this spring, and some of those in debt cannot pay their yearly interest. Merchants are also hard pressed, and have large accounts on their books, which, although good, cannot be paid until roads are put in condition so farmers can get to market and sell their accumulated produce.

BAD ROADS BEAT THE RECORD.

The roads in East Berne and vicinity are simply indescribable. They are now beginning to mend, but for the past month they have been almost impassable, and for farmers to attempt to carry a load has been entirely out of the question. Nothing but absolute necessity will induce a farmer to go

* See Albany *Argus* of April 16, 1890.

to Albany with a load of produce, and then he finds that 600 or 800 pounds make a heavier burden for his team than 2,400 would with the roads in ordinary condition.

The effect tells seriously on our local merchants. The business at the grist mill suffers because farmers, rather than draw their grain to mill through the deep mud, prefer to feed it to their stock whole. The lumber business has been affected to a greater extent than any other. The winter season is the time when farmers draw logs to the saw-mill to have them sawed into fencing material and for repairing their buildings.

This winter they have been waiting for snow and better roads, until the time has arrived when other duties upon the farm require their attention.

THE CAUSE OF THIS TERRIBLE CONDITION

of the roads is easy of explanation. For the past two months there has not been frost enough in the ground to form a bottom, and the constant travel with frequent rains, has worked the roadbed into mortar, and in many places the

RUTS ARE HUB DEEP.

Nothing like it was ever experienced in that vicinity before. There has never been a season on record when the roads have been bad for so long a period as they have the present season.

The roads near Central Bridge have been almost impassable all winter. So much so that trade has been affected to a great extent. Much of the produce that has always been brought here has been sold for less in places near production. For the past three days, however, they have improved.

The roads in the vicinity of Fonda are in an almost impassable condition, and farmers are unable to bring anything to market if they so desire. As a result, business of all kinds is almost at a standstill. The roads were never in a worse condition than now.

The roads in the vicinity of Clarksville are in a better condition just at present than they have been for the last eight or nine months, which is owing to the absence of rain for a week.

The farmers have been compelled, to a certain extent, to keep their produce at home on account of the condition of the roads. Those residing along the New Scotland plank road, or the Bethlehem turnpike, have the advantage of farmers residing elsewhere. They can go to market at anytime, while people in this vicinity are

COMPELLED TO STAY AWAY.

The worst road for the Clarksville farmers is the Delaware turnpike. From the bridge over the Normanskill to the pavement of Delaware avenue, near Bender's brickyard, it has been impassable a number of times. The roads have been worse for the last two years than before, owing to the large amount of rain that has fallen during that time.

The roads in the vicinity of Hartwick Seminary, for the first time in many months, are

ASSUMING A PASSABLE CONDITION.

The past winter, which has been one totally unlike any previous in the memory of the oldest inhabitants, has also been remarkable for the bad con-

dition of roads. In the villages of Milford and Cooperstown the roads in the main streets have been in a terrible condition, and merchants have attributed the depression of business in no small degree to this. With the pleasant weather of the past few days the roads are gradually growing smooth, and, though still having many deep ruts, farmers are traveling much more. Every year the fact is being more clearly shown that some more effective methods must be adopted to secure better roads in our country districts." * *

From twenty-seven of our states came at that time reports which, without exception, described the public roads to be in a condition not unlike those of Albany County. From one of the wealthiest and most populous western states, a state full of resources and endless possibilities for the farmer, came a photograph, taken on an important country road leading into one of the great cities. I might tell you what city it was, but the scene is no worse than could have been found in the suburbs of a hundred other towns at that time, and I have no desire to excite municipal jealousy. Here, on page 12, is the picture. You see the wagon has become hopelessly stuck, and is abandoned by horse and driver. If that horse could talk, what a story we might have! He would tell you a patient tale of pains and trials that you know not of, and assure you that a dirt road in a civilized country is as much out of place as a dirt roof.

III.

And so it was—and so it is, all over the country. Last March the farmers of Chester County, Pennsylvania, were using a six-horse team to draw a single load of hay. On the 21st day of that month one of the "leaders" in that team stumbled and fell in the deep mud and water which covered the road and was drowned before he could be got out. In Montgomery County, Maryland, during the same month, a lady recovered \$2,500 damages from the county for personal injuries received by reason of the bad roads. Costs and disbursements swelled the sum to about \$4,000. But these are only incidents, and they have no force except as illustrations. The real unmitigated iniquity of a mud road must be seen by a more extended view.

Let us try a few statistics. You hate statistics and so do I. Take them as they go, they are drier than a mouthful of dust, and we both know what that is. But once in a while the Government sends a man round to count things, just to see whether we

are all here and how we are getting on ; very much in the same way that we count eggs and chickens and measure rye and oats. We are dealing with a big subject and one which concerns all the people. Let us look at it from a standpoint where everybody can see the inspiring spectacle. I want you to understand, if you do not see it already, that a bad road is really the most expensive thing in your agricultural outfit ; that it is as much



behind the times as the hand-loom and the flail and the sickle ; that it has no rightful place in the domain of an intelligent people.

From official government sources I find that the farmers of this country, in the year 1890, had upon their farms, draft animals as follows :*

	NUMBER.	VALUE.	AVERAGE PRICE.
Horses	14,213,837	\$978,516,562	\$68 00
Mules	2,331,627	182,394,099	78 00
Oxen, etc.	36,849,024	560,625,137	15 00
Total	53,393,888	\$1,721,535,798	

* These figures are taken from official statistics compiled under direction of the United States Government authorities at Washington.

Now, to simplify matters a little, you see you have nearly \$2,000,000,000 invested in motive power of a perishable, uncertain and expensive kind. Busy or idle, these animals must be fed and cared for every day. They are boarders that you can't get rid of when the busy season is over, and it stands you in hand to keep them at work. Two thousand millions of dollars make a large sum. Invested at 5 per cent. interest it would produce nearly \$2,000,000 per week. Then you see there are more than sixteen millions of horses and mules alone, and to feed and care for these it costs the modest sum of \$4,000,000 per day. A little while ago a very clever and intelligent citizen of Indiana estimated that bad roads cost the farmer \$15 per year for each horse and mule in his service. This means a loss in the aggregate of nearly \$250,000,000 per year. Add wear and tear of wagons and harnesses, \$100,000,000; depreciated value of farm lands \$2,000,000,000: total, *twenty-three hundred and fifty millions of dollars.*

Making the utmost allowance in favor of the farmer, and granting the necessity for the liberal use of horse-power in the maintenance of agricultural traffic, it is easily certain that the farmers of this country are keeping at least two millions of horses more than would be necessary to do all the hauling between farm and market, if only the principal roads were brought to a good condition. If you assume that each of these horses is fed the ordinary army ration of hay and oats, it requires 14,000 tons of hay or fodder, and seven hundred and fifty thousand bushels of oats per day to feed these unnecessary animals, which themselves have a money value of \$140,000,000. The value of hay and oats fed to these horses per day is about \$300,000,—or something like \$114,000,000 per year.*

IV.

I was down at Hubmire's for a week last April, and we had an occasional friendly argument on this question of better roads. The wet weather had hung on, and the wagon roads were then in a desperate condition. Things were dull about the old farm and Hubmire had been dividing his time between chores and trout

* This computation is made by estimating the value of hay at \$10 per ton, and oats at twenty-three cents per bushel; these figures being close to the average values in the several States during the year 1889.

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fishing to keep off the blues. One day he had to go to town. There was something needed in the house and a dozen things to be attended to which could not longer be put off. To kill as many birds as possible with one stone, Hubmire hitched his team to the box wagon with the intention of hauling out a load of coal for the sitting-room stove. I hadn't seen a newspaper for more than a week and was glad of this chance to connect with civilization and find out whether we hadn't skipped a day in the calendar; so I accepted Hubmire's invitation and went with him. It was a slow and painful trip. The clay roads were wet, bottomless and sticky, and the horses struggled along in about the same way that a fly wades in molasses. We passed only one vehicle on all those six miles of road, and that was a hearse. It was about half a mile out of town. The team was tied to the fence, and, as we came up, we saw that the driver had left his seat and gone back a short distance where he stood with a fence picket in his hand, reaching out into the mud, and vainly trying to recover an object which seemed to be sunk nearly out of sight in the soft mire. It looked enough like a bottle to be one, but the lone fisherman told Hubmire it was a plume-holder that had "joggled loose," and dropped off the top of the hearse.

"That's Berriam, the undertaker," said Hubmire; "Guess he's goin' to plant somebody up in the Sokeville district."

"Yes," I replied, wiping a soft clay poultice out of my left eye, "It will be easy digging up in the old graveyard; I wonder how Berriam found out the man was dead."

The subtlety of that joke was too deep for Hubmire. It had never yet occurred to him that there was anything wrong with the roads. He had never seen better ones, and he knew that these were as good as the average, take it the state over.

It was the middle of the afternoon before we started for home with our half load of coal, and when we reached the "corners" Hubmire stopped at Rumsey's to water his horses and give them a few minutes' rest. The season was a little in advance of fly-time and Rumsey was taking a comfortable nap in his big arm-chair in the barroom. Our conversation outside, together with the noise of the pump-handle, roused Rumsey to the occasion, and, coming out to the doorway, he stretched his arms, legs and jaws by a kind of simultaneous reaching out of all the muscles, pulled his soft hat down in front till the rim made a

very sharp angle with the bridge of his nose, threw his head back far enough to enable him to see straight ahead and said :

"Hello, Enoch ; glad to see you ; come in and warm up a little ; how's the goin' down below ?"

"Nothin' to brag about," said Hubmire, looking at the sea of paste which covered his horses and wagon ; "beats all what a power of rain we've had this spring. How's business ?"

"Hain't made a dollar since the January thaw," said Rumsey ; "the mud is so terrible deep folks can't afford to be neighborly,



and when they do drop in they don't stop long. It takes about all their time goin' and comin'."

We followed Rumsey into the front room of the hotel and there was a solemn and musty air about the place which was very impressive. It was a "public house" with a suspension of public patronage. From four directions the roads ran in and centered at Rumsey's. Good farming lands stretched away on all sides and every natural condition was favorable to success ; but the roads were indescribable. The farmers and country merchants were surrounded and besieged by impassible sloughs of deep mud, and business was wrecked by the bondage of bad roads. Rumsey couldn't see it. He was born in it, reared in it, and it had become a part of his existence. But Rumsey was genial. He had an irrepressible load of good fellowship in his mental

cargo and was not disposed to quarrel with natural conditions—of which, to his mind, the mud road was a familiar type. To him all roads were dirt roads, for he had never seen any other. He knew that water was wet, that dirt was soluble, that clay was sticky, and he had always regarded slush and mortar as a kind of visitation of Providence to mankind—"inscrutable" enough to be sure; but nevertheless as certain and unavoidable as the changing seasons themselves. So, in season and out, wet or dry, busy or idle, Rumsey kept a placard over the pepper-sauce bottles in his barroom which read :

Welcome the coming, speed the parting guest."

V.

That night, when Hubmire had finished his work at the barn, we sat together and smoked. I thought it was a good time to talk with Hubmire about the roads; so I suggested to him that he could do all his plowing and farm work with two horses, and that if there was a good hard road running down to the village he might do all his teaming without adding to that number; that he was now feeding five horses when two or three ought to be enough.

"Now don't," said Hubmire, "don't tell me I've got too many horses; I think I know a thing or two about farmin', and I tell you I hain't got horses enough. My bay team will haul a smashin' good load of hay to town any day, and that's all any man's team 'll do. I tell you I ain't askin' for better roads than we've got right here in this township." Hubmire thinks a good deal of himself and is a hard man to convince. He never takes a drink at the town pump without first rinsing the dipper, inside and out, and in matters of argument he is just as cautious not to be contaminated by suspicious ideas. But I like Hubmire. We've had many a good day's hunt together in old times, and I've always found him a good companion and a humane sportsman. He is an honest man and a good husband, and there's always hope for a man like that.

So I kept up the fight. I said to him: "Hubmire, you are wrong. I know you keep good horses; there are none better in the county; everything about your farm is in the best condi-

tion, and there isn't a farmer in the country who has done more hard work in the last twenty years than you have done. Everything that you have found to be of value to the farmer you have added to your possessions, and if I could show you that a good road is the one thing necessary to improve your prosperity, you would be the loudest preacher for improved roads in this state. In spite of all your hard work you are not clear of debt. There is a mortgage on your farm and it draws interest night and day ; it eats into your prosperity ; there is something wrong with you and with all your neighbors. Farming is no longer as prosperous as it was in times gone by. The population of many of our agricultural districts is less than it was ten years ago ; the mortgage indebtedness of American farms is increasing at the rate of about eight and a half millions of dollars per year, and the decrease in farm value since 1880 is estimated at \$200,000,000. In the single State of Ohio this loss amounted to about \$7 per acre for the entire State, and there are other States where the proportion shows a still worse condition of affairs."

"The country is losing and the towns are gaining ; the farmers are growing poorer ; the government is growing richer. Every minute, night and day, the United States Government collects \$178 more than it spends. Think of it. Ten thousand six hundred and eighty-six dollars per hour ; \$256,320 per day ; \$7,689,600 per month ; \$93,556,800 per year. Something is wrong. It is not so in other countries. I have been looking it up, and I have at home, reports from more than twenty European countries relating to their internal affairs. In those countries the farmers prosper in about the same proportion that prosperity follows other lines of business ; agriculture holds its own, and there is no more independent class of people in those countries than the farmers."

"Now, singularly enough, the most striking difference between those countries and ours is found in the condition of the country roads. With them communication is easy and quickly accomplished. Their governments, instead of rolling up and hoarding a ridiculous surplus, spend large sums in the building and repairing of the country roads. The result is that in Europe the farmers drive 20 to 30 miles from home to market with immense loads, in all kinds of weather, at all seasons of the year, and return home the same day. The European horse hauls twice

as much as an American horse, simply because the roads are much better. His owner can visit his neighbors at any time ; drive to town ; make social calls and enjoy all the personal advantages of a resident of the city, and still maintain the independence and enjoy the pleasures of country life."

"Nonsense," said Hubmire, "I'd like to see the fairyland you're talking about. I have got five as good horses as ever pulled a strap, and I know how to take care of them. I don't drive to town excepting when the roads are good, and then, for hauling loads, my horses won't take a back seat for any man."

"Hubmire," said I, with some impatience, "I see we can never agree on this question till we settle one important difference. You say you never drive to town until the roads are good. Now, leaving out the fact that you are losing plenty of good time while you wait for the mud to dry up, just tell me what you call a good road."

"Well," said Hubmire, "any road is good enough for my horses when the mud begins to stiffen up so it will pack and roll under the wheel."

"Then let me tell you, Hubmire," said I, "that you don't know what a good road is. You never saw a good road in all your life. A good road has no mud to dry, roll or pack. It is made hard and stays hard and smooth at all times of the year, and when once made it is easier and cheaper to keep in repair than any dirt road you ever saw." But Hubmire only smiled in his good-natured, doubting way, lighted his pipe and went out to see that everything about the place was snug and secure for the night.

VI.

That talk with Hubmire troubled me a good deal. He is counted a sensible man in the community where he lives, and I could see that his words reflected the judgment of thousands of farmers of whom he was an excellent type. The mud was then drying up in places, or, as Hubmire would say, it was beginning to "pack and roll under the wheel," and one day, a week later, Hubmire drove to town with his stout span of bays and a load of hay. It wasn't a very big load, for the roads were still rutty, and after Hubmire had got into the village the big bays were

"packing and rolling" the ruts with a little too much vigor when one of the whiffletrees broke. Hubmire unhitched his team and drove down to the blacksmith's shop for necessary repairs, and while he was gone every horse and vagrant cow that came along nipped his load. It stood alone and unprotected, and here is a photograph of that load, showing it exactly as it was.

A month later I went up to see Hubmire again, feeling that I was somewhat better equipped to meet his peculiar style of



argument. I showed him this photograph of his abandoned load of hay.

"Hubmire," said I, "whenever I see an American farmer with a load of hay like that, I feel ashamed for my country. You hauled that load to market with your big bays. You thought the road was in fair condition, and it was one of those roads which you say is good enough because the 'mud will roll and pack under the wheel.' Right here is where we disagree. I told you awhile ago that the farm horses of Europe hauled twice as much as your horses, simply because the roads of that continent are better than ours. You seemed to ridicule the idea. I could not convince you by observation or experience and I have taken the trouble to bring you some pictures of European

roads, showing them exactly as they are to-day. I have been fortunate enough to find one which admirably serves the case in hand. Here is a picture taken from a photograph of a French



road, showing a French farmer with his load of hay, on his way to market, 9 miles distant."

"It will do you good to look at this picture, and I am going to leave it with you for a little while. There are something like 4 tons of hay in that Frenchman's load, or about $1\frac{1}{3}$ tons for each horse. Notice the surface of the road. It is hard and smooth, nicely sloped in both directions so as to insure quick drainage; the wheel tires are two and a half times as wide as those on your wagon, and they roll over the surface of the road in a manner that tends to make it hard and smooth instead of

cutting and creating ruts as is always the case when narrow tires are used. Notice the height of the load ; it towers up among the trees, and its immense bulk gives it the appearance of an American haystack ; compare its height with the height of the driver who walks along by the roadside or with the size of the chaise which you see coming along immediately behind. See how easily the horses jog along ; they are moving as comfortably as you can wish, and there is no sign of tugging or straining in their movements. If you had a road like that from your farm to town, you might do all your hauling with two horses instead of the five you now have and save yourself an immense expense."

"Now, I want to say to you, that the farmers of this country raised something like 45,000,000 tons of hay last year and every pound of that hay was moved at an expense of twice as much power as ought to be necessary ; and you must know, also, that this picture of a French road is by no means a special or uncommon one ; such roads may be found anywhere among the better countries of Europe. France alone has about 130,000 miles of roads practically as good as this one, and yet her territory is only about four times as large as that of the State of New York. That government spends \$18,000,000 a year to keep these roads in repair. The French Republic has adopted an honest principle of state-craft by doing something from year to year in behalf of its farmers ; it proceeds upon the theory that these roads are the property and care of all the people ; that they are a public necessity and one of the institutions of the government ; that the farmers alone should not bear the burden of making and repairing these lines of travel, which reach from country to town, since the prosperity of both town and country depend upon their condition in a most emphatic degree ; that agriculture is everywhere the gauge of national thrift and that the permanent enrichment of the Republic must depend upon the fullest development of its resources. There is a good deal worth thinking about in this matter of national policy. No country ever yet attained greatness whose farmers were not great, and in these days of improvement and driving competition, the farmer has the same right to demand means for saving time, space, power, materials and expense as are accorded by the government to other divisions of society."

VII.

I had many talks with Hubmire before I left the farm, and though he didn't seem to be quite convinced I could see that he had begun to think the matter over, and I am satisfied that Hubmire will work out a sound conclusion. He is a conservative fellow ; but he has a slow, sure, tenacious and persevering way of thinking that is sure to land him on good ground when he starts in the right direction.

I have told you of my experience with Hubmire because he is, in many ways, a typical representative of your class, and what I said to him was, in my judgment, applicable to thousands of similar cases to be found in every county of the United States.

The American farmer has nerve, vigor, ambition, industry, good soil, good climate and every natural facility for the successful pursuit of agriculture ; but the average American farm is a lonely institution. Its owner is separated from his neighbors, largely denied the many social advantages which belong to people who are able to mingle with each other from day to day, and kept at home from many gatherings, social, political and religious, from which he might receive both pleasure and benefit. His sons desert the farm for the more profitable and enlightened conditions of city life, and the allurements of profit which is held out in every community of successful farmers is not so conspicuous in the United States to-day as to entice our farmer's sons from the greater promise of success offered by mercantile occupations.

Farm property is no longer in active demand, and investments which in other years would have sought the security afforded by farm mortgages are now directed in other channels. Go to any of the large cities of the Union and you will find upon the books of the real estate dealers an endless array of notices of farms for sale or to exchange for city property.

But I did not intend to digress. It will interest you to know more about the roads of France. In that country there is no such diversity between the material progress of the farmer and that of the merchant—between the country and the town—as is found in this country. The farmers prosper and have always prospered. Every dollar spent by the French Govern-

ment to bring itself more closely in touch with its rural population, has been well invested. You remember that terrible war when from Prussia the King, the warrior and the statesman led the German legions across the breadth of the French Empire and forced the capitulation of Paris ; and how the brave Frenchmen were humiliated by the exacting terms of peace which their conquerors imposed. The immense tribute demanded by the Germans at the close of that war, now twenty years ago, was made up from moneys contributed in a wonderful degree by the French farmers, and the admiration of the world which their patriotism excited in the payment of that tribute, was not greater than the wonder which everybody felt at the ready thrift which had enabled them to meet such enormous demands.



Here is a picture showing a valley near one of the small villages in the interior of France. The scene is about 50 miles northwesterly from Paris, not far from Amiens, which many years ago was a fortified city ; but the ramparts have been tore down and replaced by splendid roadways, adding to the beauty

and thrift of the city and to the convenience and pleasure of its people.

In the foreground you see the same kind of hard, smooth road that is shown in the last picture. In the distance, running down from the hills and through the valley, you see a white line of road, showing the various directions in which these roads run and the uniform appearance which their hard finished surfaces present.

Of course these roads of France are not built by farmers who "work out" their highway taxes after the manner followed in



this country, nor are they repaired by the use of plows, hoes or scrapers like those which are brought into use at the annual farmer's picnic which takes place when you go out to "work the road" in your township. On the contrary, they are built and kept up under a system which is perhaps the most perfect in the world. There is an official-in-chief, who takes charge of all the main roads of the Republic and requires from his subordinates complete reports at frequent intervals. In this manner information is always at hand showing the condition of the roads in all parts of the country. Of course, the work is divided into different

sections, which, in turn, are in charge of subordinate engineers or superintendents. Broken stone is furnished by contract, and considering the amount of labor accomplished each year on the French roads, the cost is surprisingly small. The roads of our own states, at least the important roads, should be maintained in the same way. The inefficient, haphazard and ridiculously expensive method which we have followed for the last hundred years, should have convinced us by this time of the necessity of change. Of course I may be wrong about this, because it has never yet been determined just how long it takes a great and intelligent people to twist itself out of the rut of an accepted and established blunder. Upon this point, a keen and witty observer of public affairs says: "A hundred years is a very little time for the duration of a national error, and it is so far from being reasonable to look for its decay at so short a date, that it can hardly be expected, within such limits, to have displayed the full bloom of its imbecility."

VIII.

When I write to you about these roads of Europe I know that you are apt to believe that these European countries are more wealthy than ours; that they are more thickly populated; more thoroughly cultivated; and that these splendid roads are built for the accommodation of only those farmers whose lands are highly cultivated; but in this you are wrong. France is divided into eighty-seven "departments" or political divisions, which, in many respects, are not unlike our counties. In eighty-one of these eighty-seven departments the population per square mile is less than that of the State of Rhode Island; in seventy-eight it is less than the population per square mile of Massachusetts; in sixty-six it is less than that of New Jersey, while if you take the combined area of New York, Pennsylvania, Connecticut, Massachusetts, Rhode Island and New Jersey it will appear that the average population per square mile of these States exceeds that of seventy out of the eighty-seven departments of France. Many of these departments in France are less populous than the thickly settled counties in our western States, but the uniform excellence of the roads is everywhere maintained. On page 24 is a picture taken in one of the forests of France, where you see

no signs of cultivation and where many of the best farms are in fact some miles distant from town.

You see in this picture the same excellent quality of road as that which appears in the ones I have already shown you.

Many years ago the French farmer had the same method of making and repairing the wagon roads that is followed in your



county to-day. He quit farming for several days each year and "worked out" his road tax.

Do you think he could be induced to go back to the old style of doing things? Look at the picture on this page, copied from a photograph of a French road taken last year on the day after a heavy rain storm. The road surface is smooth and dry; the tall poplars on either side have been trimmed to the upper branches so as to let in the sun and air and hasten the drying of

the road after a storm. Then notice the heaps of broken stone on each side of the road. These are used by the workmen in making constant repairs from day to day whenever the least imperfection appears.

In Belgium also the principal roads are built and maintained by the general government, and in 1880 in the nine provinces of Belgium over 79 per cent. of the highroads were of this class, the entire length of high-class roads being 4,173 English miles, out of a total of five thousand two hundred and eighty-six miles of roads of all classes. The best roads of Belgium are in the provinces of Namur, Liège and Luxembourg, and permanent employees are kept on the roads under the directions of the chief engineer of the province, for the purpose of insuring the observance of the regulations and looking after the constant repair of the highways.

In Baden the main roads are under the supervision of the State authorities, and are cared for with a studious regard for the requirements of the farmer and inland travel. Under the law relating to roads in Baden, the duty of maintaining the road falls as follows: One quarter each upon the parish (town) and district (county) in which the road is situated. The remaining one-half upon the State treasury.

In Hesse-Darmstadt the roads are divided into two classes, called state roads and district roads, of which the former are a direct care and charge upon the general government, and when the district roads become so important as to require the attention of state officers, they can, under direction of the district assembly ("*Kreistag*") be declared state roads. Every district is bound to appoint the necessary officials connected with the district roads. These officials consist of a skilled person who must be capable of filling the office of district overseer and a proper force of laborers requisite for the work in hand. Annual sums are allotted to each province out of the state budget to pay the cost of making and maintaining the public roads.

In Italy the Minister of Public Works is at the head of the Department of Public Roads. The construction of these roads is, in most cases, undertaken by contracts, the work being carried on under direction of government engineers. These contracts extend also to the work of maintenance and repair, and include the transport of materials, the cost of earth works, embankments, drainage, masonry, ironwork, stonework, removal of

snow, mud and dust and the care of border trees planted along the sides of the highways. The contractor is bound to deposit a fixed sum of money in the hands of the public officials, to insure the performance of his contract, and, on the termination of a contract, the road must be delivered up in perfect order and repair to answer the description contained in the specifications, and all defects becoming apparent within one month thereafter



COUNTRY ROAD IN ITALY.

are made good at the cost of the contractor, under an estimate of the chief engineer of the district. The money deposit of the contractor is only returned to him upon the compliance of all the terms of his contract and in case of his neglect or refusal to execute the orders conveyed to him by the highway officials, the latter have power to direct the necessary work to be carried on at the expense of the contractor. A repetition of such offense or the perpetration of any fault on the part of the contractor, results in the termination of his contract and the confiscation of his money deposit. The Government road laborers are called "cantonniers" and are selected with great care, special reference being had to character and honesty. They must be of robust

constitution and must be able to read and write. Each one of these cantonniers is provided with a full set of tools and implements specified by law. His hours of work are from sunrise to sunset, and each day he is obliged to go over the entire track of road placed in his charge. He must be constantly upon the line of his work in all kinds of weather, and, in case of necessity, is bound to work on public holidays. His chief duties are the levelling and repair of the highways; the removal of snow, mud, dust, etc. He must assist travelers in distress and vehicles disabled by accident or by weather, and for any neglect of duty he may be fined, suspended or dismissed, according to the degree of the offense. The fines accumulated during the year are divided among the deserving cantonniers or given to one of the mutual benefit associations, of which they are members. Cantonniers who serve with credit and distinction for three or more years are promoted and given an increase of monthly wages. In the five years 1873 to 1878, Italy spent about \$16,000,000 on her roads, although before that appropriation was made, many excellent highways existed in all parts of the kingdom. In 1881 Italy constructed about 120 miles of new roads and had then about 11,040 miles in course of construction. Mentioning the policy of the Italian Government with respect to its maintenance of the public roads, Mr Beauclerk, representing the British Government at Rome in the year 1882, in his official report to the home cabinet, said: "It is therefore evident that the Italian Government are doing their utmost to develop rapidly and extensively the means of communication in the kingdom, and there is little doubt that the large outlay incurred, is fully justified by the increased prosperity and wealth of the country." At that time, something more than 5,000 miles of roads were in charge of the Italian Government. More than twenty-five hundred cantonniers were employed and their services were devoted to the care of all the national roads, except five.

In the Netherlands, as in the countries already mentioned, the principal roads are maintained at the expense of the State.

In Portugal a similar rule is adopted. The State takes the responsibility of the construction, maintenance and service of all important roads connecting the provincial capital and the principal frontier towns. The director of public works and skilled engineers have the principal direction of the Government work, relating to the common roads.

(TO BE CONTINUED.)

NATIONAL HIGHWAYS.

BY ALBERT MOTT, C. E.



ONE of our country's great ministers of finance,—one who was a statesman and political economist,—left as a deathbed legacy, these words : “ The history of all civilized countries attests the fact that the nation best equipped in these respects (means of communication), rapidly becomes the most powerful, the richest and the most prosperous.” This opinion was the result of many years of study and service to the United States Government, by the Honorable Wm. Windom, who closed his earthly career as Secretary of the Treasury. Said that profound constitutional lawyer, Daniel Webster, in the Senate of the United States : “ I look upon a road over the Alleghanies, a canal around the falls of the Ohio, or a canal or railway from the Atlantic to the western waters, as being an object large and extensive enough to be fairly said to be for the common benefit.”

It is generally, nay, it is universally conceded, that good roads are an absolute necessity in the economy of a nation ; that they are actually investments which give a return justifying the initial expense and maintenance. In some localities and for short distances they successfully compete with railroads, water courses and other means of transportation. In magnificent distances they act as feeders to the other transportation routes. They are the greatest factors in the problem of economy to the agriculturist, and to every business enterprise that results in a product to be hauled. They are absolute essentials to the military features of a vast nation where large masses of men, artillery and munitions of war are to be moved, and at the same time, act for its own protection during transit in the presence of an enemy.

The United States treasury profits by the prosperity of the people of the country. Funds appropriated for internal improvement, is an investment paying such enormous margins as would excite the envy of the money kings. It does already induce the opposition of railroads on parallel lines of water courses, although they encourage the investments in harbors at their

terminals. In one of the harbors of the country, the United States Government invested several hundred thousand dollars in deepening and widening the channel marked out by nature, and thereby increased its custom receipts from about two millions to nearly eight millions of dollars in gold. Internal improvements facilitating and cheapening hauling and transportation of bulky products, are profitable to the general government.

In improving the waterways of the country, it is the custom of the government to make one great channel or thoroughfare to which connections can be made by private enterprise. In the same manner, highways on land to principal points would be excellent investments in creating national thoroughfares, and would be the means of inviting and even inducing state, county and private enterprise to intersect and make available for themselves the great channel of commerce. The government has constructed, and to-day, under appropriations granted by Congress, is constructing national roads—not “post roads,” but national highways within the confines of States. That these roads are insignificant as to grandeur in mileage distances, does not alter the fact that the constitutional principle involved is conceded by the legislation. The principle is also emphasized by the fact that due consideration, debate and reference to authorities including that autocrat of constitutional interpretation, the Supreme Court of the United States, was given by the legislators when dealing with the question.

Wagon roads are the feeders of the markets, the railroads, the marine channels of communication and commerce of the world. Every person, every profession and every line of business is directly or indirectly interested, and the revenues of the United States Government the most. The government is a business concern, and must profit by its investment the same as any other. It is not to be expected that it will profit if it does not invest. While people may differ in opinion as to the most proper means of procuring the same end, all agree that the end should be attained in some way of providing the country with good roads. If an additional and more rapid means of obtaining the result lies in the direction of national action, then it would seem to be folly to ignore it.

In the crusade for highway improvement in this country, which had its initial at the hands of The League of American

Wheelmen, the policy has necessarily been the slow one of agitation and education of the masses to the standard that would give a due comprehension of the intrinsic value of good roads in the everyday business and pleasure of the individual, the general prosperity accomplished by them in which all participate; the demand for legislation which such an education creates, and the pushing of road enactments in the legislative halls of the different States. In brief, education creates the demand, and the demand naturally contemplates legislation. In a work of education, the kindergarten system of object lessons is not to be lightly ignored. Such object lessons would be the construction of national highways to principal points, and they would more quickly educate the people than any other process in the whole curriculum. As the general government would profit enormously by the education of its citizens in this respect, it follows naturally that the funds expended would be an excellent business investment and justifiable in every conceivable way. The general government also has the civic machinery at hand to build national roads without the additional expense of employing engineering talent. Having educated its own engineers, and paying them regular salaries which are not increased or diminished by the modesty or magnitude of the duties they are called upon to perform, the additional duty of building roads would be undertaken by the United States with a well equipped corps of engineers, who already have charge of the other works of internal improvement, and who are specially trained in similar enterprises undertaken by the government.

As this article was opened by a quotation from one statesman, it may well be closed by the golden words of another. President Madison, in a message to Congress, wrote: "Among the means of advancing the public interests, the occasion is a proper one for recalling the attention of Congress to the general importance of establishing throughout our country the roads and canals *which can best be executed under the national authority*. No objects within the circle of political economy so richly repay the expenses bestowed on them; there are none, the utility of which is more universally ascertained and acknowledged; none that do more honor to the Government whose wise and enlarged patriotism duly appreciates them. Nor is there any country which presents a field where nature invites

more the art of man to complete her own work for their accommodation and benefit. These considerations are strengthened, moreover, by the political effect of these facilities for intercommunication, in bringing and binding more closely together the various parts of our extended confederacy. While the States individually, with a laudable enterprise and emulation, avail themselves of their local advantages by new roads, by navigable canals, and by improving the streams susceptible of navigation, the general Government is the more urged to similar undertakings, requiring a national jurisdiction and national means, by the prospect of thus systematically completing so inestimable a work."

THE PERSONAL LABOR SYSTEM OF ROAD TAX.

BY CASPER TABOIT.

A TAX is the tribute which savagery pays to civilization; the entrance fee to community life; the price we pay for the privilege of living together, and for the right to fly a national flag. Your typical hermit is forever a typical sloven. He harbors no ambition, holds no visible property, needs no defence, seeks no friends, grooms himself but once a year—and pays no taxes. Like every other citizen who uses the public property without contributing to the public coffers, he is more or less a sponge. He is simply a little lower in the social scale because he enjoys the common benefits provided by the common laws, and permits his neighbors to foot the bill. He is beyond the dignifying influence of the public tax.

Now the methods and influences of every organized society entail upon its members certain burdens, and these are usually in some measure commensurate with the advantages enjoyed. For all the privileges of citizenship we tax ourselves in two ways: First, in our ambition to appear well, and to display evidences of our acquirements and abilities, we tax ourselves to pay for a thousand of the conveniences and luxuries of social life, and we pay compliment to our friends and at the same time

satisfy our own vanity by expending money in the clothing and adorning of our persons and in the embellishment of our homes. Secondly, we pay another kind of tax, infinitely smaller in amount, yet always more grudgingly expended—a tax which goes to pay for those things which we cannot personally own, nor personally pay for, and which become our property only in a kind of reflective way. This is the public tax—the money paid under an assessment designed to be equitable, and intended, not for the enrichment of the individual, but for the maintenance of the commonwealth, and the improvement of those several institutions which are created for the common good. The selfish instincts in the human mind leads us to despise this tax, and its collection is each year carried on by a sort of cork-screw process, which is alike disagreeable to the official who collects and to the citizen who pays.

Once in a life-time some social reformer whose benevolent instinct is abnormally developed, tries to lead the way to a kind of communistic reform by which each person may be induced to contribute all his gains to the public granary, and take his living with all the rest of mankind, of high and low degree, out of the public trough. But the venal impulse prevails, and to the Utopian scheme of the communist, the average citizen gives answer after the manner of the old corn law rhyme :

“What is a communist? One who hath yearnings
For equal division of unequal earnings ;
Idler, or bungler, or both ; he is willing
To fork out his penny and pocket your shilling.”

And so the prominence of self is the prevailing thing to be recognized in the treatment of public questions, and every reform which promises benefit must promise that benefit to the individual.

But every individual taxpayer has an interest in the way in which the public taxes are expended and the public institutions maintained. He is a shareholder of the body politic—a part owner of the corporate property which the State controls. In this view of the case let us consider the road tax question. The common road is not, in fee, owned by the public. It is commonly a strip of land, a line of travel, in which the public has acquired an easement, a right to travel perpetually for all the purposes of inter-communication and traffic, and wherever a

state has been erected by the adoption of an organic law, some provision has usually followed for the construction and maintenance of these lines of public travel. When the United States became a nation it was easy and simple to adopt colonial methods, and as these methods related in some respects to the use and keeping of the common roads, it was an easy step to borrow the road laws of England, since England was the mother of the colonies. At that time there were few better roads than the English roads—and none worse. There were better road laws than those of England ; but, not being printed in the English language, they had little claim upon the American affection, if indeed they had any place within the field of American knowledge. So we adopted the English law and the English dirt road. That law, like a hundred others on the English statute books, has outlived its usefulness. It was a relic of feudalism, involving a system of statute labor which was born of an ignorant brain and suited only to answer conditions of national poverty or a system of serfdom. In the early days of the republic the fortunes of war and the undeveloped condition of the country compelled us to subscribe to the first of these conditions, and to yield to the embarrassments which it imposed. We were poor, individually and collectively, and might well have been excused for attempting to “work” our own highways, even in that crude and unsystematic way which the passing century has bred within us as a national habit. But we have long since outlived the pains and trials of national infancy. The American greenback holds a front rank in the financial procession, and our national treasury is being enriched at the rate of a hundred millions or so a year. Every species of public debt, national, state, county, and town, has largely decreased within the last decade ; the savings banks of the country report a large increase in the number of individual depositors, as well as a corresponding swelling of the funds deposited, and every kind of industry seems to have been enriched in value and quickened in its operations by the development of population, and by the adoption of the thousand and one methods and appliances which forever seek a market in populous centres. Save only the farmer. He and his industry are beyond the stimulating influences of most modern inventions, and while it is true that his methods of tillage and harvesting have been improved and

lightened by the use of machinery, it is no less certain that the general prosperity of the farmer has not kept pace with that of other branches of society, and that the allurements of gain is no longer conspicuously prominent in the general field of American agriculture. Indeed it is quite safe to say that the American farm, in general, is not increasing in value.

It is well worth while to inquire why this is so. The value of farm produce is not essentially less than in former years. The methods of farm work have been lightened by improved appliances, and from the farmer's standpoint, the conditions are quite as favorable as at any time in the history of the country. But from the standpoint of the business man and the investor, other lines of business offer more substantial promise. The value of farm property in these days must depend not only upon the quality of the land, its productive qualities and its location, but it must be considered also with a special view of the lines of communication which connect it with the market. Delays, uncertainties, the amount of power required, unnecessary expense and useless wear and tear are important questions with the capitalist and the investor of these days, and every obstacle which stands in the way of constant and regular business transactions, is a blemish which no shrewd tradesman will tolerate.

This obstacle, to the American farmer, is the common dirt road. By long use, and through ignorance of a better kind, he has learned to endure this sort of highway, and he has not yet learned that in all the route from the home farm to the ultimate consumer, the dirt road which leads from his dooryard to the railway station is the line of greatest resistance, and that which imposes upon him and his neighbors not only the chief burden of transportation, but which is maintained at a cost far exceeding that which is required to keep in repair the best roads of modern Europe. It all comes from our adherence to the antiquated and ridiculous idea of "working out" the road tax. Every road is a structure and needs a foundation. A good road was never built by accident, nor maintained by ignorance. It is quite as senseless and futile to attempt to build and maintain a good highway by the calling out of A, B, and C from their various personal occupations to maul and scrape a few miles of soft dirt with hoes and shovels, as it would be to expect the same persons, under a similar system, to contribute their

personal labor in the successful erection of a state house or a county penitentiary. In either case the proper completion of the work would require that it be done under an intelligent head and by persons whose knowledge or instruction fitted them for that kind of employment. Moreover it may be said that besides these objections, the system of "working out" road taxes presents certain features which are inequitable as among the citizens themselves. The money collected from those persons who elect to pay their assessment in money rather than by personal labor is, in many cases, diverted to mysterious uses which only the town politicians have power to disclose; while, on the other hand, the labor performed here and there by that little squad of farmers who count their time so cheaply as to render it in the public service for the sake of saving a dollar a day, is generally applied where it is likely to tend to their personal benefit, without regard to the general requirements of public travel. I believe I run no risk of successful contradiction in saying that the money and labor spent by the people in the State of New York alone within the last half century in the keeping of one of the vilest systems of dirt roads on the face of the earth would more than suffice to build and maintain fifty thousand miles of the best macadam roads that modern skill could produce. The simple fact is that under the present system the money is squandered and the labor misapplied, wasted and practically thrown away. Drainage, grading and every elementary idea involved in the making and keeping of a good road is ignored, and the work is done without rule, reason, or any regard for ultimate results. On every mile of dirt road sixteen feet wide within the settled portions of the United States there falls each year nearly nine thousand tons of water. What becomes of it? Under the present enlightened system of "working out" road taxes, we permit this water to stand for months at a time in great pools, and proceed to churn and mix it with the soft dirt by the use of narrow wheel tires till the fierce days of summer carry off this water by the slow process of evaporation, and then, in the easy and opportune time, we apply the lazy process of squaring our road tax account with the public by a kind of shiftless tinkering, which makes the road even worse in summer and leaves it all the more susceptible to the dissolving influences of the autumn showers. The

system is all wrong. Other nations have long since abandoned it. Their farming properties have improved in value, and the payment of road taxes in money under a system which requires that the highways shall be properly made and properly kept throughout the year has produced such amazing results in the enhancement of rural conditions that no kind of argument could induce the European farmer to accept the drawbacks and embarrassments of the old system.

To sum up the whole matter the personal labor system of maintaining the public roads is a travesty and a failure. It has been tried everywhere and has never succeeded anywhere. It may be safely asserted that since the foundation of the American Government there has never been a single mile of strictly first class road built and maintained under this system. It is a blot upon our civilization, a scourge upon the industry of the farmer and upon every town surrounded by a farming population. It is the most expensive to maintain, the least efficient in its uses, and it produces a road the most exasperating in its normal condition of all the roads ever contrived by the human hand. It is degrading to the state and to the citizen whose personal labor it demands in the public service, for it is well to remember that the only two classes of persons of whom labor is exacted under statute law in payment of an obligation to the state, are the farmers who work upon the public highway and the criminals who perform labor in the common prisons. The American farmer deserves at the hands of his state a more elevating, a more equitable and a more efficient law. Let us away with the old system, and, following the later and time proved methods of other countries, place at least our main roads under the charge and direction of skilled officials, and impose upon the State at large the obligation of keeping them in suitable repair.



RAILROADS AND WAGON ROADS.

IN the planning and construction of a new railroad, that location is generally sought which is deemed most likely to contribute to its carrying trade, and to this end its alignment is carried as far as possible through populous centres and through those regions where the natural conditions are such as to invite an increased population and the development of agriculture and traffic. In many cases, where the surrounding country is of a substantially uniform character, it is not uncommon to reckon that the carrying trade of the railroad will receive its contributions from a strip of territory of say three, five or ten miles in width, as the case may be, and located upon either side of the railroad line. Beyond the limit of this width it has been generally assumed that the difficulties of land travel, the cost of hauling produce over the ordinary wagon roads of the country and the usual handicaps imposed upon this kind of traffic by the uncertain conditions of the weather, during long seasons of the year, will bar the farmer and the tradesman from establishing a regular connection with the railroad market, and compel them to establish a more limited market in the smaller inland towns. The experienced railroad projector seldom goes astray in his calculations, and in these particulars the history of the American railroad has verified his view. If you travel along the route of any of the great trunk lines belonging to the American railroad system, you will find that the local freight business, immense as it may appear in the aggregate, is a very reliable barometer in the determination of the rural weather and a most exact indication of the condition of the country roads. If you will stop off for a day in the market town of any farming district, through which one of these railroads may happen to pass, you may learn from the local freight agent, not only that the farm produce delivered by the farmers at his station is hauled from a territory limited by the radius of a few miles, but that for weeks at a time in the rainy seasons of the year the delivery of this produce is practically

stopped, and that during such seasons nothing but the very refinement of financial extremity can induce a farmer to attempt the journey from his home to the railway station. Three things result : first, the territory which contributes to the carrying trade of the railroad at each one of these hundreds of country towns is extremely limited, owing to the miserable quality and uncertain condition of the country roads ; secondly, even this limited territory becomes a dead and passive factor in its relations to the railroad traffic whenever the rains of fall and spring make these roads impassable ; and thirdly, the depressed condition of trade which, in every country town, is brought about by the succession of farm traffic during these seasons, reacts, in some measure, upon the railroad and upon the condition of its local business. The object lesson which these facts instill into the mind of the local freight agent might well be impressed upon the attention of the railroad manager. In the same way that rivulets and brooks carry their contents to the swelling tide of the great river, so the common wagon roads of the country are the lines of traffic which contribute their loads to swell the freighting business of the great railroads.

That these highways should be improved and developed ; that they should be constructed and repaired under a thoroughly competent system and by competent persons is of greater importance to the railroad proprietors than they seem to commonly understand.

Let us look at it from a technical standpoint : if we assume that a radius of three miles is made to describe a circle having the railway station as a centre, and that the territory within this circle is all that may be depended upon to contribute its products regularly and with certainty to the freighting business of the railroad, we may easily compute that this area will include about 18,000 acres, or say 180 farms of the average size of 100 acres each. Of course the common roads which extend in different directions throughout this three mile circle are always carried beyond its limits into the surrounding territory where, by various cross roads, connection is made with the main routes leading to the market town. What would be the effect of improving these highways so that the radius of the contributing circle should be increased to six miles instead of three ? The new circle, by that rule of mathematics which de-

finds the superficial ratio of one circle to another, would contain four times the area of the inner circle, or to be more explicit, it would contain over 72,000 acres or about 724 farms of 100 acres each, of which only one-quarter would be included within the inner three mile circle, and the remaining three-quarters (over 54,000) would belong to the surrounding belt. In productive capacity the extended territory would equal about 5,500,000 bushels of potatoes, or in corn, 1,140,000 bushels, or in hay a little over 65,000 tons.

Of course, with the further enlargement of the contributing belt, an immense increase of contributing products will again result. It is hardly worth while to pursue the mathematical feature of this question, for it will be evident to every reader that even a moderate improvement of the radial highways leading to the country railroad station will tend largely to increase the volume and insure the regularity of its country traffic, both as to freight and passengers.

In still another respect—an unmistakable one—is the development of good roads of importance to the railroads with which they connect. I refer now to the increase of trade, population, and wealth among the town communities which are fortunate enough to secure an improvement of the suburban roads by which they are immediately surrounded. The measure of this benefit to the railroads cannot be determined by mathematical formula; but by the proof of experience it has been so abundantly established that no prudent man in these days will attempt to gainsay it. In New Jersey, Rhode Island, Massachusetts, Indiana, and other states where road improvement has been carried on in the vicinity of railroad towns, these beneficent results to the town and to the railroads have followed without exception. The demand for suburban property seems to be the certain result which follows the improvement of suburban lines of communication, and in each case the facilities offered by good roads for the constant and regular passage of country traffic, has enhanced the prosperity of the market town, enlarged the proportions of its market trade, invited the production of larger crops to answer to the increased demands, and added to the social as well as to the material condition of all the people within the widened influence of these improved roads. To the thoughtful railroad man these considerations will have abundant force. In

many of our states, the rapid development of railroad construction has carried us to a point where the building of new lines cannot now be profitably undertaken, and it would seem as though no better policy could be undertaken in the development of railroad traffic than that which looks to increasing the trade of existing lines. The building of American railroads at the outset was made possible, and the investment of railroad capital, encouraged by the liberal enactments of both national and state governments, and while it would be idle to expect these railroads to contribute to the improvement of state roads as a matter of mere sentiment, it is quite easy to see that from their standpoint as investors, it would well pay the great railroad companies of the United States to lend their aid and influence to the education of the people at large upon the question of better roads, and to the securing of that class of legislation by which the uniform and systematic improvement of the common roads may be brought about.

WARDEN (of insane asylum):—This poor woman imagines she is shopping all the time. Sometimes she sits in silence for whole weeks.

VISITOR:—What is she doing then?

WARDEN:—It is supposed that she imagines she is waiting for change.—*Cloak Review.*

YE STICKER AND YE STUCK.

God made two classes of mankind,	He liveth on ye fattest things,
Ye sticker and ye stuck ;	And driveth round about.
Ye first is made of finest clay,	But ye poorer stuck doth never laugh,
Ye last is made of muck.	He groweth lean and lank ;
Ye sticker hath ye royal time,	And seeth all his pennies fade,
And hath ye untold hoard ;	In yonder failing bank.
But ye poorer little one he stuck	God made ye classes as they are,
Hath no more "tick" for board.	I doubt not He knows best ;
Right jolly is ye sticker man,	But still ye sticker man gets all
He beeth broad and stout ;	And pulleth down ye vest.

—*Philadelphia Press.*



THE EDITORS TABLE

A WORD of introduction. The creed, politics, purpose and declaration of principles of this publication may all be declared by the two words of its title, GOOD ROADS. It is the sole property of the national body of the League of American Wheelmen, and no other person, copartnership, or corporation, has any pecuniary claim, lien or ownership, either present or prospective, in any of its property, funds or material affairs. It will be issued from the Bureau of Roads Improvement, founded by the Executive Committee of the League and devoted to pushing the roads improvement reform with more extended facilities and upon a broader basis than has ever before been attempted within the United States.

Although published and maintained by the efforts of the League at large, GOOD ROADS will invite the co-operation of all good citizens who favor the move for improved highways, and especially will it ask and expect the support of those citizens whose business and property will receive pecuniary benefit by the improvement of the public roads and streets. To the wheelmen of the League and to the wheelmen of America we make special appeal for that hand-in-hand support which our fraternal relations give us a right to expect, and upon which the success of this magazine must in a great measure depend. In the discussion of League affairs and the affairs of wheelmen we shall aim to exclude from our columns all matter of a partisan or offensive nature, and shall confine such discussion to that branch of League work which pertains to the improvement of the public highways.

We shall publish from time to time articles from men of commanding ability and position, and such articles will be selected and given place solely with the view of their value to our reading

columns and their interest to the general reader.

In the pursuit of this policy, if we are sometimes forced to exclude contributions from members of the League, it must be remembered that we look solely to the establishment of a successful and influential magazine, and that in the attainment of that object we must hold to a higher motive than the gratifying of that pleasure which comes from showing favor to our friends and brothers. GOOD ROADS will be illustrated, and with the progress of time we expect to make the pictorial feature of the magazine of special force and value. Everybody will concede the wisdom of this, for all the world loves a picture, and when a picture can be made to both entertain and instruct its measure of usefulness is doubled. Buckle says: "For one person who can think, there are at least a hundred persons who can observe. An accurate observer is no doubt rare; but an accurate thinker is far rarer. * * And, inasmuch as thinkers are more prone to accumulate ideas, while observers are more prone to accumulate facts, the overwhelming predominance of the observing class is a decisive reason why induction, which begins with facts, is always more popular than deduction, which begins with ideas."

And so, concurring in the idea expressed in the somewhat pedantic phrases of Mr. Buckle, we shall court the attention of the observer, by pictorial illustrations, of those facts which go to prove the necessity of better roads, and which the American field will tend to supply in such enticing quantities. And now, with confidence, we ask the indulgence of our friends and readers for those errors and shortcomings into which our uncertain efforts in a new venture will be likely to lead us.

WE have sometimes wondered why it is that in the line of public improvement, and especially those improvements which affect the agricultural population, the United States Government has been so slow to avail itself of the advanced ideas and methods which seem to be adopted and taken up so quickly by foreign countries when once the value of these improvements has been established. We have received some enlightenment on this question by examining the report of Secretary Rusk, of the Department of Agriculture, for the year 1890. From this report it appears that the Department of Agriculture is practically without any representation abroad, and that the march of improvements, which in other departments have kept pace with the genius of France and England, has been crippled and neglected in that branch of the public service which is specially designed to serve the interests of the farmer. Secretary Rusk says:

"I desire to record here very emphatically my conviction that some method must be adopted by which, as occasion requires and without long delays, this Department shall be enabled to send representatives to foreign countries, in cases where only personal visits can be relied on to secure much needed information. The subject of world-wide competition has been dwelt upon at length on so many occasions that it would be purely superfluous to insist here upon the active competition which meets our own farmers in every market where their products are offered for sale.

* * * * *

It may be well, perhaps, in this connection, to call attention to the fact that we are in this respect far behind the other nations of the world, however disagreeable it may be to confess it. Important gatherings of men devoted to agricultural science, and enjoying, by the courtesy of the government under whose jurisdiction they assemble, every privilege and facility for gaining information in regard to the agriculture of that country, are constantly being held in various parts of the world, at which representatives of this, the greatest agricultural country in the world, are conspicuous by their absence. * *

A most notable instance of our omissions in this respect was furnished during the meeting last September of an international agricultural congress at Vienna, in which we had been especially invited to participate by the Austro-Hungarian Gov-

ernment, at which over eleven hundred delegates were present, including distinguished representatives of agricultural interests from every country in Europe, from Japan, from Australia, from India, and from South America, and at which were discussed subjects of profound interest to American agriculture. This was a meeting at which, for many reasons, it was most desirable that the United States, through this Department, should have been officially represented. Unfortunately, for want of adequate provision, the United States alone, of all the leading countries of the world, was absent. Let me here recall the fact, that since I had the honor to assume the office of Secretary of Agriculture, I have been visited by gentlemen from Austro-Hungary, Germany, Bavaria, France, Great Britain, Canada, Australia, New Zealand, Japan, and even from one of the native principalities of the East Indies, the official representatives of departments analogous to my own in their native countries, traveling under orders from, and under pay of, their respective governments, armed with all the official credentials necessary to secure to them every attention and courtesy necessary to the prosecution of their inquiries. Thus do these countries indicate their willingness to learn whatever we may be able to teach them. Thus do they recognize the fact upon which I have already insisted—that there is an intellectual, as well as a commercial competition, to which the old maxim, 'knowledge is power,' applies with a force which all must recognize."

Yes, it is much that way. Our ministers and consuls represent the government in the important cities and towns of other countries, and their connection with the home department of state is intimate and important. Our treasury is guarded and our securities handled with a skill which any government on earth might emulate. Our munitions of war and military methods are kept to the highest standard, and we are building a navy which promises well to rival the powerful navies of Europe; but we are forgetting that a few thousand dollars out of our fat treasury might well be spent in the study and adoption of those means and methods which quicken the internal industry of the country and enhance the condition and prospects of our rural population. And, incidentally, a few lessons in road making might not be astray in the pursuit of this sort of knowledge.

LAWS AND LEGISLATION

FROM the thirteenth senatorial district of New York (comprising the counties of Orange and Sullivan), comes gratifying news of the re-election of Senator William P. Richardson to the state senate. His sturdy warfare during the last two years in the cause of roads improvement, and the marked change of sentiment on this subject within the legislative halls at Albany, have made him the target for numerous mossback criticisms, and for the first time in the history of the state, the roads improvement question became an active factor in the election of a member of the legislature. Senator Richardson has not only been re-elected by more than double his former majority, but is the only republican senator in the state who goes back to Albany with an increased majority. We have before us a letter written by Senator Richardson, under date November 28th, in which he says:

"I made the fight in my political campaign fairly and squarely on my state roads bill, and ran two hundred votes ahead of my ticket. I intend to re-introduce my roads bill the first day of the session, and am more thoroughly in earnest to secure its passage than ever before. With political sentiment rapidly crystallizing in favor of the measure, the prospect is brighter than ever."

We heartily wish him the success he deserves.

In this connection it may properly be said that the Richardson bill is designed to be the most far reaching and immediate in its effects of all the state legislation thus far proposed on the roads question. It provides that the governor, with the consent of the senate, shall appoint four competent citizens of the state to be commissioners of state roads. These commissioners shall be divided equally between

the two principal political parties, and when appointed shall be authorized to borrow, on the credit of the state, the sum of ten millions of dollars, at a rate of interest not exceeding three per cent. per annum, and reimbursable at such times as the commissioners may determine, not exceeding, however, the term of eighteen years from the date of the loan. Moneys raised on this loan are to be applied exclusively to the payment of cost of surveying, laying out, constructing and maintaining state roads in the several counties of the state; not, however, within the limits of any cities or incorporated villages. The location of these roads is to be decided by the state engineer, under direction of the commissioners, and under their approval the state engineer and surveyor is to determine the character and kind of roads to be constructed in the different localities. All work is to be done by contract, let to the lowest possible bidder, and the commissioners are at liberty to utilize, as far as practicable, the labor of convicts in the state prisons, penitentiaries and jails, as well as that of paupers and tramps who may be supported at the public expense. Turnpikes belonging to private corporations may be included in the line of improved state roads under this bill, and compensation is to be made to the proprietors, under agreement with the commissioners, or by condemnation proceedings and appraisal, in case an agreement cannot be reached. To become a law, this bill, by reason of its peculiar constitutional features, requires the approval of the people at a general election, and its passage by the legislature will therefore open the way to a widely interesting and lively issue in the State of New York upon the subject of better roads.

THE subject of free delivery of mails in the rural districts has been exploited with much prominence in the last report of the Postmaster General, and seems now to be engaging the attention of farmers in all parts of the country, and at the last session of the National Grange, at which thirty-three states were represented, the measure received unanimous approval. The current number of the *Farm Journal* publishes a very interesting article in support of the new scheme. We quote:

"Our last Congress appropriated \$10,000 to make a preliminary test. Forty-six country post-offices in thirty states, and covering as many of the varied conditions of our great country as possible, were selected for the trial. Of these, all but seven at the end of several months showed an increase over former receipts and usual gain, of enough to pay the entire cost of the new service and leave a profit besides. Seven did not quite reach the cost. The increase of gross receipts in thirty-nine offices amounted to \$6,213.49. Deducting what rightly belonged to natural increase, and the net balance to the credit of the free delivery service amounted to \$850.50. This success is a wonderful showing when it is considered that in the establishment of the free delivery system the patrons of the office stopped paying box rent, and the loss on box rents was therefore taken from the gross receipts. The forty-six free delivery offices aggregated 285 months of free delivery service, at a total cost for carriers of \$4,420.69, and a net profit, as before said of, \$850.50. An entire year of these offices aggregating 552 months would, at the above rate, have resulted in a net earning of \$3,812.54, and this profit is on an appropriation of only \$10,000. With an appropriation of \$200,000 for a year on these figures, for a basis of estimate, the net earnings, or profit to the Government, would reach \$76,250.80. How many farmers are now paying \$2 or more a year for a post-office box miles away from their farms? Based on the above figures of actual practice, for only twenty to forty cents a year for each inhabitant, the mail can be brought to each door. How many farmers would gladly give that in a hurried season to have their mail brought a single time? The cost of the extra carriers amounts to from \$100 to \$200 each per year. Unlike city carriers, those in the villages and in the country will not generally be required to give all their time. * *

Urge this just measure now upon your Congressmen and United States senators. Think about it; talk about it; work for

it, and it will come. 'Heaven helps those who try to help themselves.'"

GEN. ROY STONE, whose active interest has made him prominent in the work for better roads since the beginning of the movement, has been recently at work on a plan for enlisting legislation by the general government for the improvement of roads throughout the country. A memorandum prepared by General Stone is before us. It includes the following features:

1. A National Highway Commission, to be composed of two senators, five members of the House of Representatives, and five citizens to be appointed by the President of the United States, together with the Secretaries of War and Interior, and the Postmaster General, who may be represented by subordinates from their respective departments, and also an associate member from each of the states and territories that may choose to appoint one. 2. The commission to continue for two years, and to hold its sessions in Washington during the sessions of Congress, in Chicago during the World's Fair, and elsewhere at other times. 3. Among the duties of the commission to be: (a) To formulate plans for a National School of Roads and Bridges, with provision for branches to be connected with the various agricultural colleges and experiment stations. (b) To collate the various recent state laws regarding highway improvement, with full information of their practical workings, and to suggest such a combination or modifications of the provisions of those laws, as may secure the best form of state aid to local communities in road construction. (c) To inquire into the practice of other countries, and report whether any form of national aid is desirable here and how it might be given. (d) To collect and disseminate general information regarding roads and their improvement, and especially to provide for the exhibition at the World's Fair of the best methods and appliances for road-making, with organized free instructions in the art to all who may desire it. (e) To consider and report whether, in any part of the United States, post or military roads could profitably be established and built by the government as examples in road construction.

Gen. Stone has laid his proposition before his co-workers, and has sent memorandum outline of the plan to prominent men in official positions, so that the entire matter may be well considered before being incorporated in a Congressional bill. The scheme is certainly an important and far-reaching one, and is well worth the attention of our national law makers.



NEWS AND COMMENT

THE property owners interested in the extension of St. Mary's Avenue, met at Rosebank (Staten Island) on the evening of December 15, and began formal proceedings to secure the extension of that avenue for a distance of about half a mile. All the property owners, with one exception, were represented at the meeting and approved the project. The rapid development of property values on Staten Island within the last few years, is largely, if not mainly due to the interest shown by the people of Richmond County in the improvement and extension of their streets and avenues.

THE Richmond, Virginia, *Times*, of December 13, is out with a strong editorial in favor of improved road laws for Virginia. The editor says: "The fact that a number of counties have obtained from the Legislature special road laws for themselves shows the effort to struggle from under the present system, which is conspicuous for its inefficiency in making good roads and the opportunity it affords for shiftlessness and fraud. * * * The general operation of our road laws is unbusinesslike and unfair. * * * They really produce but little good and tend to educate the people in the belief that the public service demands the least amount of activity and capacity, and that the public coffers are open to the plunder of conscienceless officers."

What is here stated of the existing road laws of Virginia might be truthfully repeated regarding similar laws in other States. It is beginning to be generally understood not only that the labor applied by Tom, Dick and Harry in the working out of their annual road tax is

lazily, slovenly and uselessly applied; but that the moneys collected by the road officers in many of the States have too often gone into the pockets of the collectors instead of into the public coffers. In the face of this gigantic system of petty stealing, which the people have tolerated for a hundred years, because of its inconsiderable character in individual cases, it is difficult to hear with patience the moss-back objections to engineers and commissions upon the ground that commissions do not always handle public funds to the best advantage. Let us by all means have the money placed in the hands of responsible men, and have the plans of expenditure so systematized that we may all know what is done with the funds.

LIKE Oliver Twist, the good people of New Jersey want more. Not satisfied with the splendid development of traffic and property values which has followed the building of good roads in and about Union and Essex Counties, they have resolved upon a State Convention to be held at the State House, Trenton on January 22, 1892, at the conclusion of the annual session of the Board of Agriculture. The Executive Committee of this Board has been corresponding with prominent men in different parts of the State, and a formal call has been issued to secure a representative attendance at the Convention. The Governor is deeply interested in the scheme, and will probably make recommendations to the Legislature, looking to the development of legislation for good roads in all of the several counties. Secretary Dye of the State Board of Agriculture has the co-operation of Chief Consul G. Carlton Brown, of

the New Jersey Division of the League of American Wheelmen, and the entire aid and influence of that Division will be exerted to support the project in question.

At the Convention a number of papers will be read. Thomas H. Dudley, of Camden, will, it is expected, read a paper on "European Roads." It is possible that the outcome of the Convention will be a commission to codify the present muddled road laws, and devise such legislation as will place roads under the supervision of the State and counties, and that a permanent commission will be created to designate State roads and look after them.

THE Carriage Builders' National Association, at its recent Cincinnati Convention, adopted the report of Colonel Albert A. Pope, as Chairman of the Committee on the Improvement of the Roads, and passed formal resolutions commending the work of Colonel Pope and recommending a special committee of two members from each State, to be selected by the Executive Committee, and authorized to urge upon the various State Legislatures the need of better road laws and appropriate legislation.

MISSOURI stands prominent among the Western States in her movement for improved roads. At a recent meeting of the State Board of Agriculture, at Fulton, special prominence was given to the subject of better country roads, and Hon. J. L. Erwin, of Fulton, was made President of a new State association designed to encourage this work. In view of a probable extra session of the Legislature during the present winter, a petition has been widely circulated through the State, asking Governor Francis to make special mention of the necessity of road legislation in issuing his official call for the special session. To Chief Consul Holm, and his able co-workers in the Missouri Division, is due much credit for the active feeling now manifested in Missouri in favor of good roads.

THE following cheerful Christmas telegram was sent over the wires of the Associated Press from Burlington, Iowa :

"BURLINGTON, Iowa, December 25.—It would take a round \$1,000,000 to even up the losses in trade to the merchants, shippers, and farmers in Iowa on account of the fearful mud blockade which exists, not only in Iowa, but all over the Mississippi Valley. For two weeks country roads in Iowa, Missouri and Illinois have been hub deep in mud, and the farming communities have been virtually padlocked on the farm. As a result, merchants depending on country trade have suffered immense financial loss, especially in holiday trade, while the farmers and shippers have lost by inability to market their products. It is feared many failures among country merchants may result."

Every farmer and merchant in the United States should be compelled by law to read that telegram three times a day for the next six months. If somebody had suggested last fall to the people of the Mississippi Valley that a million dollars of their money invested in the improvement of roads would be well spent, the suggestion would most likely have been laughed at, and if a law had been passed imposing upon the farmers and merchants of that section, a tax of one million dollars for roads improvement, a mental panic would have occurred, which, in noise, riot, and general disaster, would have resembled an earthquake. But the million has gone, and the roads are no better.

TENNESSEE is beginning to show a live interest in the good work. The Agricultural Experiment Station at Memphis recently issued a pamphlet containing valuable points on the improvement of country roads, and now an active movement has begun in Knox County, for the extension of the celebrated pikes in that section. A writer in the Knoxville *Journal* of December 28, says :

"Over ninety per cent. of the taxes of Knox County are collected within a radius of five miles from the custom house, and if the cheap lands of the remote districts are to enjoy the favor of good roads from a fund, 90 cents on the dollar of which is

raised from this city and suburbs, a contribution of free hauling certainly appears fair enough, and in addition the great saving of time will be an ample reward.

"There is serious discussion on the part of some members of the county court, it is said, to build more than double the miles of pike in 1892 than was ever built in one year before."

THE illustrated pamphlets published by the Roads Improvement Department of the League of American Wheelmen during the last year have attracted the attention of foreign readers, and applications have been received from the proprietors of English and French publications for permission to reproduce the plates and printed matter in their columns.

THE Overman Wheel Company has published a most unique little vest pocket pamphlet on "Power of Wheels." It is all included within six pages containing only about 300 words, and a portion of it runs like this:

"Do you know that the wheel is the connecting link between barbarism and civilization, poverty and wealth; that by it the world moves, and upon it all great work depends? Do you know that the horse which staggers with 500 pounds upon his back trots off easily with 2,000 pounds loaded on wheels? Do you know that if you were chained to 500 pounds of iron in the form of a cube you would die if bread was but one-eighth of a mile off?—that in a cask you could roll 2,000 pounds around the earth? Do you know that every time you step you lift your weight (say 100 lbs.) one inch, which, added up, makes a lot at the end of a day?—that on a bicycle you can go farther, faster and easier in the same time? Take the wheel from the locomotive, and one-half the world's industry would die. Remove it from the car, carriage and factory and the wealth of the world would dwindle nine-tenths. You would hear of no Goulds, no Astors, no Vanderbilts. Wall Street would go down a tradition to future generations."

WE are indebted to Hon. Mortimer Whitehead, Official Lecturer of the National Grange, Patrons of Husbandry, for valuable printed matter relating to the affairs of that body, including a most interesting report on the "Rural Free Delivery of Mail." Mr. Whitehead writes us that

the farmers in the Grange organizations have been discussing the question of good roads for some time, and that much good is coming out of it.

BY way of editorial novelty, the New York *Sun* has lately taken upon itself the interesting task of computing the probable population of Hell. It estimates as follows:

"In round numbers the earth has a population of 1,300,000,000, of whom 300,000,000 are professed Christians, the other 1,000,000,000 being Mohammedans, Buddhists, Jews, pagans, and heathens. The whole race was condemned to eternal punishment for the sin of Adam. This was the fall of man, from which there was and is no redemption save through the death of Christ. Biblical chronology gives the earth a period about 6,000 years. From Adam's time to Christ was 4,000 years, during which period no human souls were saved. The population may then have averaged 1,000,000,000. Three generations, or 3,000,000,000, pass away in each century. Forty centuries, therefore, consigned 120,000,000,000 of men to eternal fire, and, for all we know, they are there now. In the 1,900 years that have elapsed since the birth of Christ, 57,000,000,000 more of human beings have lived and died. If all the Christians, nominal and real, who have ever lived on the face of the earth have been saved, they would not number more than 18,000,000,000. Now, if we deduct this latter number from the grand total of 177,000,000,000, we find 159,000,000,000 of souls who are suffering the torments of hell fire, as against the 18,000,000,000 who have escaped. But this is not the whole truth. Nobody believes that more than ten per cent. of the professed Christians are saved. Calvinists say that the elect are few. If this is a fact, Heaven contains but 1,800,000,000, against a population in Hell of 175,000,000,000."

We don't like to criticise the treatment of a subject with which we have so meagre an acquaintance; and it is enough for us to believe that mud roads will not be tolerated in Paradise, and that they will quickly dry up in the other place; but, without intending any piracy upon Mr. Dana's new field of speculation, we might suggest that his statistics indicate a tremendous field for the circulation of an asbestos newspaper.

BORROWED WIT



THE SPOONY MARRIED MAN.

'Tis mostly trifles in this world that make our sum of woe,
A sort of moral insect tribe that stings where'er we go;
But of all plagues devised to mar the great terrestrial plan,
I think the biggest nuisance is the spoony married man,

With his

"Petsie, itsie darling, place oo hand in mine,
Round oo little dainty waist, arm um twinum twine;
Tiss oo huggen huzzens, while um smooove um turls,
Don't be tross and fretful, now, oo baddest ittle girls!"

A Jew once had an enemy who kept a big hotel,
Down where the waters green and cool in crested billows swell;

He sought revenge, but much despised all common modes of strife,

He simply sent as boarders there a spoony man and wife.

It was

"Itsie, bitsie wild bird, pining for its mate,
Bad tundoctor stopum train, make um husband late,
Brought um's dess and bonbons, Cinderella's s'oots,
Birdie nest on dear one's breast, while um tell um news."

Full soon the boarders left the stoop, and some came home with jags,

Each morn revealed a jostling line of town-bound traveling bags;

They pleaded business, flood, and fire, shipwreck and loss of life,

But no one breathed a word about the spoony man and wife.

The landlord wildly paced the beach, and gazed upon the surf.

He thought the money rashly spent, or dropped upon the turf;

"But what has ever brought me this?" he cried in wild despair,

When suddenly he came upon this spoony married pair.
It was

"Tootsie, wootsie dum-drop, ittle huzzens tum,
Don't oo pout so naughty, don't oo bite oo thumb.
Ownest tried to get here sooner than him am,
Muzzer's bird of birdies and dear's one's pettest lamb."

The landlord raged and stamped and tore; his passion knew no bounds;

He bade the man, with one wild roar, to quit his house and grounds;

He fired his baggage in the sand and chased him with a knife,

And now contests a lawsuit with the spoony man and wife.

—George E. Devyr.

"What are you opening that can of tomatoes with?" inquired a wife, gently, from a room adjoining the kitchen.

"Why, with a can opener of course," growled the irate husband. "Did you suppose I was opening it with my teeth?"

"No," rejoined the wife, more gently than before; "but from the tenor of your remarks I thought you might be opening it with prayer."

I notice that in every jury there is at least one crank. There was one jurymen who hung the jury for six hours because the prisoner was deaf. He said he had read somewhere that it was contrary to the Constitution to convict a man without a hearing, and he hoped that his right arm might cleave to the roof of his mouth, if he ever went back on the Constitution of the United States.—*New York Herald.*

Peddler: "Beg pardon, ma'am, but I am agent for Dr. Feeder's Spice Root Bitters, and I'm sure if the members of your family would try them they would soon have the finest appetites."

Lady at Door (severely): "This, sir, is a boarding house."

Saidso: Since Jackson returned from his Western trip he seems to have a mania for damming Niagara.

Herdso: Sad case; fell in with the hackmen, I suppose.



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In the foregoing pages you have been told how to make good roads. We wish to tell you how to get a good vehicle already made.

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AND A TYPE OF
CIVILIZED
SOCIETY."

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❖ FEBRUARY, 1892 ❖

NO. 2.

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magazine devoted to
the improvement
of the public roads
and streets



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our ordinary lines of internal
communication is a disgrace
to our civilization."

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ISAAC B. POTTER

Managing Editor

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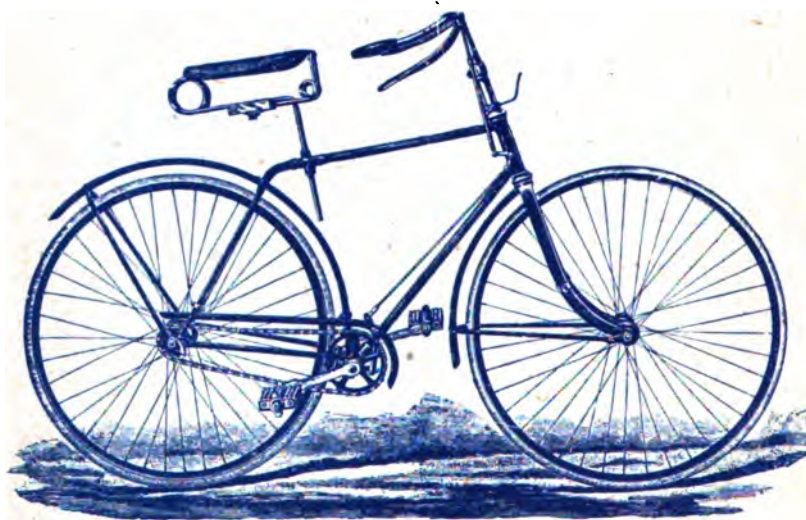


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GOOD ROADS.

Vol. I.

FEBRUARY, 1892.

No. 2.

THE GOSPEL OF GOOD ROADS.

By Isaac B. Potter.

IX.



It is interesting to note that while some unimportant differences exist among European countries in the details of management and maintenance of the public roads, these countries are practically unanimous in their policy of placing the important roads under the direct man-



agement of the general government and of paying the expenses of construction and maintenance out of the general funds of the state. The result has been most salutary. The splendid facilities for the moving of travel and traffic over these improved roads, have proved the wisdom of placing the important roads under the care of skilled engineers and workmen, and the object lesson thus taught has borne fruit in the wonderful improve-

ment of the provincial roads, which are maintained under management of the local authorities. It is no uncommon thing in France, Baden, Germany, Austria or Italy to see loads weighing in the aggregate from three to four times the load hauled by the ordinary farm team in our country, while the distances frequently traveled by the European draft horse with these immense loads are so much greater than the maximum attempted by the American farmer as to be almost beyond belief. On page 51 I show you a picture reproduced from a photograph, taken within the last year, upon one of the German roads. Here is a view showing a loaded two-wheeled cart, drawn by two horses, and bearing six large casks of wine, a load weighing in the aggregate several tons.

It needs only a casual view of this picture to show how easily this immense load is rolled over the smooth surface of the highway, and with what little effort the horses are able to perform their task. Thousands of miles of these roads exist in all parts of Europe ; and so jealously are they regarded that no policy of state government seems to be in favor which does not include a proper care for the country roads.

Two-wheeled carts are in very common use among the farmers of Europe, just as they are in some parts of our own country. They hitch their horses one before the other, in "tandem" style, and most of their heavy loads are hauled in this way. Now let me show you a picture of an American tandem work team with an American load on an American public highway. Here you have it :



This picture was taken within five miles of the public buildings of one of the largest cities in the United States. The load contains only 400 bricks, which is considerably less than a fair load for one horse on a good road. The team has stopped to "blow," and double time is wasted in that way. These are the roads that make business unprofitable. They wear out horses, harnesses and humanity, kill patience, and keep you at the public house, when a better road would enable you to quicken your trip and save expense by dining with your family at home.

Your old friend, Horace Greeley, used to enliven his argument for better roads by relating the story of a farmer who took a drove of hogs a very long way to market, and found the delays and difficulties of his trip to be so expensive that he was compelled to dispose of his hogs at a considerable loss. On reaching home one of his enterprising neighbors, who had some thought of trying the pork-raising business himself, asked him how much he had cleared in his enterprise.

"Well," he replied after some reflection, "I had the company of the hogs."

Now compare the Philadelphia picture on page 52 (I really didn't mean to disclose the name of that city), with the last one before it, and take note of the fact that the German load is fully five or six times as great as the American load, and that this difference is due entirely to the difference between the road surfaces shown in the two pictures. You see there is no theory or guess work in this matter which is not doubly proved by actual facts. You can't afford to do business with no better hope of profit than "the company of the hogs."

In lower Austria, near Vienna, where the material for road-making is not found to be conveniently at hand, the government offered a very substantial reward a few years ago for the discovery of a solid and suitable substance which might be used in the improvement of the roads. The Austrians employ several thousand road cleaners regularly, together with a suitable number of inspectors, and maintain a system of continual repair, clearing off the dust and mud as fast as it accumulates, and repairing the slightest defect in the road, so as to prevent the formation of ruts.

In Hungary, the state roads are under the management of the ministry of public works, while the country and parish roads are kept up by local management.

In Bavaria, the government roads are made and kept in repair at the expense of the state, the money being voted by the legislative bodies of the Landtag. To prevent these roads being cut up a stringent law is enforced against the use of narrow wheel tires, and the width of tire to be used is laid down as follows :*

Two wheel wagon with two horses		4 inches
Two " " three or four horses		6 "
Four " " two horses		2½ "
Four " " three or four horses		4 "
Four " " five to eight horses		6 "

Carts having more than four horses, and wagons having more than eight, are not allowed upon the public roads, except by special permission obtained from the authorities of the province. Fruit trees are planted along the sides of the roads under favorable conditions, and these are given into the care of the roadmen, with permission to exhibit at the various fairs, where prizes are awarded for excellence of the samples.

X.

I have heard American farmers say that they were opposed to having the public roads put in charge of civil engineers ; that they had no desire to be "scientific," and were opposed to "scientific" management of the public roads. I think I have heard you say this. Let me tell you, in the most friendly way in the world, that you could not, to save your soul, help being scientific. You are scientific when you paint your house, put tallow on your boots, grease on your wagon axle, hone your razor, smoke your hams, fumigate your hennery, or take peppermint for the stomach ache. That patent incubator of yours is a perfect marvel of science. It is not wise to think a man is more scientific than you are simply because he may know a thing or two in his particular line of business which you do not. He might object to your knowledge for the same reason, for in many things your superior wisdom makes you more scientific than he is. Besides, your average civil engineer is likely to be one of the best fellows in the world ; and if he is worth his salt you will find him wide-awake, practical and interesting ; democratic in his ways, plain in his dress, and with a head full of good sense. He is always

* These widths are here expressed in inches for the convenience of the American reader. They are reduced from the dimensions given in the Bavarian statute, where they are expressed in centimetres. The dimensions given above are practically the same as specified in the statute, the greatest variation being about one-tenth of an inch.

looking for ideas, and he will concede your superior knowledge of farming and be glad to learn of any valuable thing that you may tell him. He may not know the difference between timothy and mullen stalks, but he can show you how to build a road as good as the best in the world and one that will last for forty generations. He will tell you that it needs something besides horse-power, axle grease and profanity to move a loaded wagon from farm to market ; that the harder and smoother your road is made, the shorter your distance becomes from farm to town, and the less power will be required to haul your produce.

Did you ever wonder why it is that the great railroads of the country are constantly improving their roadbeds, adopting improved rails and employing "section gangs" to constantly keep their tracks in the best condition? I will tell you why it is : Years ago it was found that the cost of running a great railroad line was decreased by every improvement which tended to lessen the grades and make the track smooth and hard ; and the best engineering talent in the world has been employed to bring these railroads to their present condition of excellence. Twenty-five years ago, before the general adoption of the long, solid-faced steel rail, the power required to move the rolling stock was considerably greater than at present. In 1870 it cost the New York Central Railroad Company about one and one-sixth cents to move each ton of freight over 1 mile of railroad. This seems a very small sum, but as small as it may appear, it was reduced in 1889 to about five mills. Other railroad lines show a corresponding decrease in running expenses, all due to the improvement of the tracks and roadbed.

The practical conclusion is this : A good roadbed pays ; it saves power, shortens distance and time, increases speed, insures comfort and safety, and is, in whatever way you state it, a good investment. Now, the wagon by which you haul your loads to market bears the same relation to the road that the railroad car bears to the steel track ; the car and the wagon are both vehicles, and in the earlier days of railway traffic railway cars were drawn by horses just as wagons are drawn upon the common road, and just as street cars are now drawn in the cities. The ordinary street car, drawn by two horses, weighs 5,000 pounds ; the open car used in summer will seat fifty passengers, weighing 7,000 pounds ; total, 12,000 pounds, or 6 net tons, and this load is drawn by a team at the rate of 6 miles an hour without diffi-

culty. The wheels of your wagon are made round and true ; they turn upon axles as smooth and well lubricated as those of a car ; your horses are as good as those employed in the street car service, and you have every facility for moving large loads quickly and cheaply, except the single requirement of a good road. Of course I do not intend to argue that wagon loads can be hauled upon a high-class road as cheaply as upon the steel railroad track, but I have shown you enough to convince you that the ordinary dirt road is in no way fitted for your business, and that a wonderful contrast exists between such a road and the well-made highways of other countries.

Another thing which your engineer will teach you is that work to be done cheaply must be done in a systematic way ; that



the cheapest way to care for a road and to keep it in repair is to place it in charge of some person who will be held responsible for its condition throughout the entire year. In your township the roads are mended or "worked" once, or at the most, twice, a year, and for the balance of the season are neglected. Even when the warm weather of spring has dried up a considerable portion of the road so as to make it fairly passable, great mud holes are found here and there, in which the farmers frequently become stuck with heavy loads, causing no end of delay and trouble. Here is a picture taken on one of the busiest farm roads in this country, showing just the kind of mud hole I am writing

about. This picture was taken long after the frost had left the ground, and it simply shows the kind of neglect which exists all over this country, and which grows out of the inefficient, shiftless and irresponsible methods by which our country roads are cared for. A chain is no stronger than its weakest link and a road is little better than its deepest mud hole.

If you look at this picture you will see that the bank slopes off on either side toward the creek which runs under the bridge. Twenty minutes' work with a pick and shovel would have drained that water from the road, and yet it had stood there for several days at the time when this picture was taken.

You might be able to haul a ton of hay over that dirt road for a mile on either side of this mud hole, and yet your team would be stuck at this point with a load of half that size.

And so you see that this is, after all, an important question, and one which most of all concerns the farmer. Look at it in another way. Suppose that you and half a dozen of your clear-headed neighbors should form a kind of partnership, and make a contract with all the other farmers in your county by which you should be required for a period of ten years to do all the hauling of farm produce between country and town. You would find that under present conditions you would have to feed and care for 10,000 horses every day ; that you would have 5,000 wagons to keep in repair, besides an immense number of harnesses ; that you would be required to employ a great number of drivers ; that your bills for horse feed, harnesses, repairs, blacksmithing, etc., etc., would be a constant and enormous drain upon your resources, and that for several months in each year your work would be done at an enormous loss. Suppose that you should sit down with your copartners for the purpose of devising a way of curtailing expenses and making the business profitable. Clearly enough the first suggestion in order would be that of reducing the number of horses and hired help and of devising some way by which more and quicker trips could be made and larger loads hauled between farm and market. There is one way in which this could be done and which stands prominently above all others, and I will leave you to consider what that is. Every state is a kind of partnership, a kind of corporation, in which we all hold more or less stock, and in which, as intelligent citizens, it is our duty to devise means for carrying on the state business with as little loss and as much gain as possible.

XI.

You know that the great volume of internal trade in every state is the common road trade. It exceeds by millions of tons the entire carrying trade of the railroads ; for, in addition to the fact that the great volume of freight carried by the railroads is, in the first instance, carted in one form or another over the common highways of the country, you know that enormous quantities of produce of all kinds are wheeled over the common roads under the requirements of local trade in rural sections, and that these vast quantities of produce consumed in the local market have no



connection whatever with the railroad traffic. And so it becomes important to inquire in what manner this great carrying trade which is constantly going on over the common roads, and which supplies, not only the immense freighting business of the great railroads, but the more important inter-communication between neighbors in the local market, can be carried on with best facilities and with least cost. I have tried to show you that upon this question of economy the great railroad corporations of the country have established a valuable precedent. Each of these corpora-

tions is in the business to make money. Their one object is to give little and get much ; and yet, in spite of the gradually reduced rates charged by the great trunk lines to the general public, they have steadily increased in prosperity till the enormous wealth of many of these companies has become the wonder of the century. These railroad corporations began business in a crude, undeveloped, and, in some cases, unsystematic way. Their desire for gain sharpened their wits ; they experimented, and by experiments they found that the greatest saving of expense in the management of their railroads was to be attained by the adoption of easy grades and by adding to the smoothness and hardness of the roadbed. These two qualities of smoothness and hardness are the essentials of a good wagon road. You cannot have and keep such roads without good laws and intelligent supervision. Here is another picture, showing one of the roads of Brittany. Did you ever see a road like that ?

It is made to last for all time, and is kept in repair at half the cost and labor expended on the average dirt road of this country. It is looked after with the same system and care that are bestowed in the management of the other departments of government, and every farmer living on the long line of that splendid roadway is happy and independent, in the consciousness that he is every day and every way in touch with the great world of business and society.

XII.

It may be interesting for you to know that the exact difference in power required to move a given load over different kinds of road surface, has been determined many times, and so often verified as to be well settled. From these experiments you may know that on the smooth surface of a Macadam road one horse will haul twice the load that the same horse could on the best dirt road, and from five to ten times as much as can be hauled by a single horse when the dirt road is covered with soft mud and ruts. From this you will understand that the value, even of a dirt road, depends very largely upon its condition and the care with which it is kept in good repair.

And right here, I must say to you, that the great destroyers of the common earth roads are water and narrow wheel tires.

In the first place, those roads are, as a rule, wretchedly drained, or, in many cases, not drained at all. If a deep side ditch could be maintained on each side of the ordinary dirt road, and kept clear so as to receive and carry off the running water, the quality of the road would be improved, in most cases 100 per cent. This is a point which farmers seem to meagerly understand, or, at all events, one which they rarely put to practical use. Water has no place in any road, good or bad. It is more hurtful than any other agent of destruction. It should be carried off and out of every road as soon as it falls, if possible. Now, as to wheel tires, let me remind you that you said a little while ago that a road was good enough for your purpose whenever the mud would roll and pack under the wheel; and by this I understand that you look upon your wheel as a roller. So it is. Every road becomes smooth by the application of a roller, and this smoothing process is hastened or retarded by the quality of the roller itself. If you have a wheel tire $1\frac{1}{2}$ inches wide, like those upon your farm wagon, every time you go down the road with a ton of produce, your wagon wheels sink into the soft mud, form ruts, and tend to keep the road in a rough condition. Your $1\frac{1}{2}$ inch "roller" will not profitably exert its rolling qualities until the mud becomes nearly dry. A wider wheel tire would serve your purpose much better; and if the farmers of your county would use wheel tires 3 or 4 inches wide, as are used abroad, your dirt road would be rolled into passable condition in half the time that is now required to accomplish this result.

Next to water, nothing is so destructive of a good road surface as a heavy vehicle running on narrow wheels. It has been proven over and over again that wheels with $4\frac{1}{2}$ -inch tires cause only one-half the wear on the road that results from the use of wheels with $2\frac{1}{2}$ -inch tires. It used to be the rule in England to make the tire 1 inch wide for every 500 pounds of load or vehicle; that is, if the vehicle and load weighed 2 tons, 4-inch tires would be used; but it was not found profitable to increase the width much beyond $4\frac{1}{2}$ inches, except in cases where wagons were used without springs, when they were sometimes made as wide as 6 inches.

You ought to treat this matter of wheel tires as you do other things in which you are interested, and give it the same sensible consideration that you apply to the things about your home. When you built your house you commenced by putting down a

16-inch stone foundation, and on that you built the framework of the superstructure. You made the foundation broad to prevent the settling of a load which was intended to remain unmoved as long as it should last, and yet you should know that the weight per inch upon that foundation is less than one-quarter the weight per inch upon your narrow wheel tires when you go to market with a heavy load, to say nothing of the fact that your wagon carries a moving load, and is, therefore, much more likely to disturb the foundation than though it remained quiet. Your wheel tire is designed to touch the ground at one point only, and when it is pressed into the earth so as to increase this point of contact, the power required to move a wagon and its



load increases very rapidly. You should use wide wheel tires, and should encourage your neighbors to use them also.

Another thing in connection with the use of dirt roads is this: The ruts in every dirt road are multiplied and made deeper and more troublesome, simply because the hind wheels of the ordinary farm wagon "track" the front ones; that is, when the wagon goes straight ahead a small rut is made by the front wheels, and the hind wheels coming along in the same track enlarge and deepen the rut. Now you may easily see that if the hind wheels were placed a couple of inches farther apart than the front wheels, they would tend to rub out or wear off the edges of the ruts made by the front wheels, and the result would

be that the roads would sooner become smooth and passable. You never saw wagon ruts at a turn in the road, did you? The reason of this is that when a wagon is turning the hind wheels do not follow in the tracks made by the front wheels. On these three points of bad drainage, narrow wheel tires and "tracking" wheels, hang many of the miseries and defects of a dirt road.

Two years ago the people living in the suburbs of a Pennsylvania town put down a mile or two of material intended for "Macadam." It was a fairly good substance, but wholly unlike Macadam in form and finish, and, worst of all, it was left to settle and harden under the wagon wheels of passing traffic. In a short time the narrow wheel tires work the usual result, and several lines of deep ruts were formed, running throughout the entire length of the new roadway. On page 61 is a picture of that road as it appears to-day. It shows more clearly than any argument I might offer the evil done by narrow wheel tires.

XIII.

Sometimes I hear it charged by thoughtless farmers that the railroads are largely responsible for the existing misfortunes of farm life, and that the freighting of grain and similar products from the immense and fertile farms bordering along railroad lines at low rates, has killed the business of farmers who own smaller and less productive farms, and shut them out of competition. I have also heard the opposite view maintained by other farmers, who assert that the railway freights are altogether too high, and that if these were reduced a farmer could ship his produce to distant points, and still realize a comfortable profit. The railroad is the best friend the farmer ever had. It has enriched this country beyond a limit that could possibly have been attained before railroads were constructed. Your grandfather used to haul wheat 200 miles in a farm wagon and sell it for thirty-five cents a bushel. His farm had no fence to enclose it; his stock was protected by only a most primitive shed, and everything about his home life was conducted on a miserable and undeveloped scale. If you are living 6 miles from a railroad, on an upland farm with gravelly soil, you cannot expect to raise corn and wheat as cheaply as the farmer who plants his crops in the black loam of the prairie and reaps a thousand acres at every harvest.

His farm is perhaps close to the railroad station, and the railroad will haul his grain from Chicago to New York at twenty cents per hundred pounds, and make a handsome profit by the operation. With that sort of competition you will never grow rich at farming. Don't concern yourself too much about through freights. Look out for local freights and the cost of transportation right at home in your own county. It costs you more money to haul a ton of produce from your farm to the railroad station than it costs the railroad company to haul the same amount 1,500 miles. You are both using the same power. The main difference is in the track. When you are about to buy a steam engine to perform a given service, the manufacturer tells you that you need an engine of say ten "horse-power." Steam tugs, passenger boats, steam pumps, steam locomotives, and all kinds of steam engines are rated accordingly to the "horse-power" which they develop. All this came from the old custom of ascertaining the exact amount of work which a horse could do under certain conditions, and comparing it with the steam engine. You haul your loads to the market by horse-power; and if you give your horse-power the same chance to work its results to the best advantage, you will find that local expenses and home freights will be diminished in a wonderful degree.

Another thing; if you find it unprofitable to raise wheat and oats, try garden vegetables or dairy farming; raise fruits and berries and sell them at home at the nearest market. The distant farmer who works the mellow soil of the prairie cannot deliver fresh fruits and vegetables, eggs, butter and milk at your county seat as cheaply as you can do it, nor in most cases can he do so at all. Study the capacity of your farm and see if your soil and other conditions are not adapted to this kind of industry. One thing you must remember, however, it is an indispensable condition to the successful market gardener and dairy farmer, that he should deliver his goods in the local market regularly at all seasons of the year, without regard to weather or the condition of the roads. Wherever a large town is found in which any sort of thrift has been established, there is a demand for the best quality of farm produce. Fresh butter, eggs, vegetables and fruits, if raised close at hand, command a much better price than those brought from a distance and subjected to the trials of railroad freighting, delays and repeated handling. The distant farmer cannot compete with you in these lines, and

if your town customers can be made to see that the home supply is reliable and constant, the home farmers will control that market.

Last March (1891) the government at Washington issued a very interesting census bulletin on the subject of "Truck Farming." Every farmer should read it. I will quote from the last paragraph of this bulletin just enough to show you a bit of enlightened opinion on the point which I have just been urging. The author says :

"Taken in its entirety, this comparatively new industry is found to be in a healthy, prosperous condition. New sections are being developed from year to year that to a certain extent affect the prosperity of some of the older ones, and there is likely to be more or less shifting of trucking centres every few years, all upon advancing lines, however. New and better methods of culture, with the future invention of labor-saving machinery, must of necessity reduce the cost of production. *Better transportation facilities will place the products of these farms in cities and towns more promptly, in better condition, and at less cost, while the ever increasing population and wealth of the cities and towns insure a greatly increased consumption, at satisfactory prices, for first-class productions.*"

XIV.

Of course you know that the distance of any farm from the nearest market affects its value. If located within a short distance of the town, it is worth much more than a farm of the same quality six miles distant. The reason of this is that the farmer nearest the town has many advantages which the more remote farmer has not. He can haul his load to market in a shorter time and save much labor in marketing his crops. His social advantages are increased, and he is possessed of many opportunities which would have been denied him had his farm been located any considerable distance from the town. But you know also that nothing shortens distance and saves time to the traveler as improved methods of quickening traffic and the means of transit upon which the traveler relies. It used to be a long week's journey for the American farmer to travel two hundred

miles by wagon road to the nearest city, and since the railroad enables him to cover the same distance in five hours, he feels that his farm and home are so much nearer to the great centre of trade, and that its value has been enhanced accordingly. If you could drive over the six miles of wagon road between your house and the village in one hour at all times of the year, and haul a full load of farm produce into the bargain, you would feel your farm has been moved considerably nearer the market than it now seems to be, and its value would feel the benefit of that difference. There is no guess work about this statement. It is a result which has always followed the construction of good roads. I could tell you of a hundred instances, but one or two will answer our purpose here :

Not very many years ago, in the State of New Jersey, there were three or four small towns in which the community was made up of a plodding population in modern circumstances, doing business on a low scale, in accordance with their poor facilities for communication. When the mud was hub deep the patient New Jersey farmer who lived in those towns stayed at home and waited for the roads to dry up. No matter what might be the prevailing prices in town, he had no means of taking substantial advantage of them. Meanwhile, the consumers in the cities and villages depended, in a measure, upon the supply of country produce raised in that vicinity, and in times when the farmers were tied up by the bondage of bad roads, they were oppressed by a slack supply, and, consequently, by enhanced prices. Trade was uncertain and farming was carried on with indifference. If you could go with me to those towns to-day you would find a marvelous transformation. From a collection of farms, at one time connected by dirt roads, there has, in the last few years, sprung up one of the richest farming and residence localities in the United States. Many rich people have moved their homes to these towns and a flourishing condition of things has taken the place of the easy going and slipshod methods which existed in the days of the dirt roads. The prime reason of all this improvement is familiar to every resident who lives in those towns to-day. The beginning of prosperity began with the construction of the first improved road. Land values increased, traffic was quickened and enlarged, social communication became more easy and more frequent, schools, churches, shops, market places and railroad

stations became more accessible, and the country, in consequence, more attractive as a place of residence.

One of the oldest inhabitants of that section,* in an interview relating to the roads in his county, a short time ago, made a practical explanation which his long residence and familiar knowledge make worthy to be repeated. He stated that the common idea that the roads of these towns are well paved because rich people had come there, was erroneous, and declared that rich men had come there simply because the roads were well paved ; that it had been found by the New Jersey people of his town that a team could pull twice as much over a smooth road as over the average dirt road, and pull it twice as rapidly ; that he himself had teams at the time of that interview hauling stone to the new "Prudential Building," and that these teams were drawing 6,500 pounds to a load ; that he knew by experience that the roads



which they were using were hard and smooth and that teams could not draw more than 3,000 pounds over the road. Speaking of the general increase of land values brought about by the adoption of improved roads in the State of New Jersey, the same gentlemen went on to mention the result of good roads in Union County, New Jersey, and stated that a few years ago certain land belonging to his own brother (about 123 acres) was valued at from \$50 to \$75 an acre; but that the owner was unable to sell it at even that price. The farm was unprofitable ; bad roads made it difficult and expensive to get the farm products to market, and the profits were insufficient to pay a fair rate of interest on the estimated value of the land. Every day that he owned that farm he became poorer.

One day the "road improvement craze" took hold of the people in Union County, and about sixty miles of Telford roads

* Mr. Thomas Nevins.

were put down. The result was that his brother had just received an offer of \$200 an acre for the old farm which he had vainly offered to sell for from \$50 to \$75 per acre. Moreover, the farm became profitable. To be sure, there was a little increase of taxes, but the owner of a farm, the value of which had



been increased \$125 per acre, could hardly complain of the slight increase of taxes, which was, after all, quite inconsiderable. The whole subject was summed up by a statement in these words : "Why, there are fully 600 miles of Telford roads in the State of New Jersey, and I know what I am talking about when I say that *the increase in land values brought about in Union County alone*

would pay six times over the cost of every foot of stone road put down in the state."

Last month I received a photograph showing one of the roads of Union County, and I am glad to be able to produce it here for your benefit. The next time you are besieged and tied up at home by bad roads just sit down and look at this picture, and take my assurance that you can have just as good ones in your county if ever you have the courage to go about it.

At another time the same gentleman stated a little incident in his personal experience which might well be here related. He said that a few years previous he had bought forty-five acres of land for \$1,500 per acre not far from Orange. He opened up the land and put in the best kind of Telford road. This, with other improvements, brought the expense of the land up to about \$10 a front foot. He sold that land pretty nearly as fast as he could draw up the deeds, and none of it brought less than \$30 a front foot. The party from whom he had purchased the forty-five acres still owned seventeen acres on the other side of the road, and had offered it for sale at \$1,200 per acre before the new road was put down. A year later the purchaser of the forty-five acres bought the seventeen acre piece at \$2,000 an acre, and in less than two months afterwards sold enough of it to pay the purchase price and the cost of all improvements, and still retained a portion of the seventeen acre piece for which he was then offered \$100,000. He adds: "This is only one instance of what road improvement has done for me, and it will act the same way for any individual or any community that takes it up in an intelligent way."

Let me cite another instance, showing the benefits resulting from improved roads; this one in the State of Indiana.

In Parke County, in that state, much improvement in this line has been shown, and the practical results of good roads have created a general demand for their extension in other parts of the county. It used to be the custom of farmers in that section to "work" the roads in the same manner, and with the same ignorant attention to the work in hand, that had been given it by their fathers and forefathers away back to the feudal times in English history. They went out on that streak of disturbed soil which by force of custom they called a "road," and under pressure of annual assessment proceeded to scrape and maul the soil for three or four hours per day. When the farmer was too busy to

indulge in this annual diversion with the neighbors, it was permitted that two of his boys were allowed as a substitute for their father, and one of these "substitutes," writing at a later day, says: "It was as good as a holiday." One day it came to pass that two or three theorists and cranks began to talk to the people of Parke County about constructing turnpikes and gravel roads. They were met by arguments which the good people of Parke County would be ashamed to have repeated here, and they made few converts. Finally one enthusiast in the county built a mile of gravel road and paid for it out of his private purse. He was a radical on the road question and wished to convince his neighbors; but they only made fun of his efforts and plunged along in the mud till it became apparent that there was only one mile of



IMPROVED FARM ROAD IN PARKE COUNTY, INDIANA.

good road in the entire county. This mile of good road preached a powerful sermon. It was a better argument and made more converts than all that had been talked and written to those people for generations. A wave of common sense rolled over into Parke County, which contained at that time the muddiest road in the state. A few enterprising people led the movement for an improvement of this road, and in a short time a solid highway was completed over which the farmers drew their loads with ease, pleasure and profit. This road was the second convincing argument in that part of the county, and it routed the opposition. The people found that nothing served to increase their individual and collective prosperity so much as good roads, and in a few

years seven splendid gravel pikes were completed, all leading to the county seat, while all main roads in the county and the worse portions of the cross roads were well graveled. A writer,* whose early years were spent in this county, relating the great benefit which accrued by reason of the better system of roads, writes as follows :

"The common roads were also greatly improved, and to one who left the country, as I did, in 1867, and crossed it only by rail, till 1879, the change was wonderful. Country travel had become a delight. Those who had been there all the time could not appreciate it so highly, and the 'old fogies' were still kicking against every new road.

"To me there was something amusing in noting how many results there were which no one had anticipated. Of course the farmers hauled much bigger loads, and did it in March more easily than in August; wagons lasted a great deal longer; horses were rarely injured, and so it paid to keep better stock, and, what was of very great importance, markets could be reached at any season. But the most striking results were purely social, so much so as to suggest a revised text, thus: 'Easy communications increase good manners.' Good highways are certainly the prime factor in civilization.

"The farmers, formerly isolated for weeks together, discovered that they could go where they would with ease, and at the very season when they had the most leisure. To ride a few miles after supper was an actual pleasure, and soon almost every school district had its social, or religious, literary, or political organization, and some had all four. There were lyceums, lectures and joint debates, recitations and amateur theatricals—something really instructive and entertaining within a few easily covered miles for the farmer for half the evenings of the winter. The Quakers of the northern township soon had a regular series of literary contests; the people of two villages got up very creditable musical societies, while the 'young folks of Raccoon Valley' capped the climax by taking the abandoned Bridgeton Church, refitting it in semi-theatrical style, and giving a fairly good season of the 'legitimate drama.'

"Now it is quite the common thing for a popular lawyer or other professional from the county seat, to ride out 10 or 12 miles after business hours, deliver a lecture to a crowded district

* Mr. J. H. Beadle.

school-house, and canter home by late bedtime. There has been a general 'brightening up.' The winter, once so gloomy to the isolated farmer, is now the season when he really lives. Another remarkable effect was to create a sort of furor for elegant turn-outs. That county was long noted in the adjacent cities as the best market in the country for fine buggies and carriages, and at the county fair one may see hundreds of farmers' families in vehicles so elegant as to attract attention and excite criticism, indeed, for a writer in one of the county papers lately alleged that 'the only trouble with the farmers is that they have been extravagant.'

"The improvement in 'roadsters' is remarkable. Now that a trotter is no longer liable to break his leg or his neck, indeed, on a country road, one can afford to put some money in him; there are several noted stables in the county, and the 'Rockville Track' ranks high in that racing circuit. These are a few of the many incidental advantages. No doubt some of these improvements would have come in time anyhow, but a very great deal must be credited to the fine gravel roads."

XVI.

In January, 1890, the New York semi-weekly *Tribune* published a communication from Mr. D. A. Barker, who stated that the town of Sweden, Monroe County, N. Y., then owned a stone crusher, and hired men by the day to run it. In the spring of 1889, the town appropriated \$2,000 to crush stone, and, according to Mr. Barker's estimate, this sum was sufficient to furnish stone for five miles of perfect road. The stone was donated and the town paid for hauling and crushing, while the different road districts hauled the crushed stone from the pile, and put it upon the roads where needed. Mr. Barker continues: "I think that money thus expended goes ten times as far as any other in making highways. In the last three years the town of Sweden has made about 20 miles of road so good that a team can haul as large a load in this open muddy weather as in summer. The land is clay, and the roads not laid with stone or gravel are simply fearful. It would pay a person to go a long distance to see what has been done to the roads in the town of Sweden. When the roads are all made with crushed stone, and fences removed

from the bleak places where snow drifts, the millennium will not be far away."

Another thing ; you ought to have roads that you could be proud of. If there is any improvement in your town or county which makes it worth mentioning, you are bound to tell of it. You never saw an American town having good roads whose people did not know that their town was superior to yours ; they know the value of a good road and they talk about it. I have been telling you what Mr. Nevins says about the Orange roads in New Jersey and what Mr. Beadle says about the improved roads in Parke County, Indiana. You see that they are both proud of the fact that they belong to progressive communities ; their children can go to school when yours cannot ; their wives and daughters can visit the neighbors, attend church, go to the village and get a little of the pleasures of life, while yours are shut up at home by the overwhelming bondage of bad roads. In Spring and Fall they are engaged in a continual warfare to keep the house clear of mud that is tracked in by everybody who steps outside the limits of the door-yard. The carpets become filled with grit, which tend to wear them out in one-half the time they would otherwise last, and your clothing suffers in a similar way. In summer it is dust instead of mud ; but in whatever time of year you take it, a dirt road is not only an intolerable expense to the farmer, but an intolerable labor-making nuisance to the farmer's wife. Somehow it seems to be a common notion among farmers that a dirt road when dried by the summer sun and worn into fairly good condition by passing vehicles, is as good a wagon road as can be had for the purposes of farm traffic. This is a stupendous mistake. Every dirt road sinks more or less at the point of contact with the wheels of a heavy wagon. If the road is composed of soft material the depression is, of course, greater, but whether of soft gravel or clay, it always exists in some degree. Many years ago an instrument was made, a kind of "spring balance," by which could be ascertained exactly what power was necessary to haul a loaded wagon over roadways made of different kinds of materials. This instrument has since been made in different forms and used on hundreds of different occasions, so that its results are proven to be of great value. It was found by these experiments that a horizontal force required to draw a wagon and load of 21 hundred-weight over a "Telford" road was only 46 pounds.

showing that the load was fifty-one times greater than a power required to haul it. To haul the same load upon a gravel road (laid on earth) required a power of 147 pounds, or three times that found necessary on the Telford road. These results show that the hauling of loads upon gravel roads, which are commonly believed by the farmers to be as good as any, cost about three times as much as upon a well made Telford road. The experiments which I am telling you about were somewhat extended, and their results were so interesting that they might well be studied by every person interested in the improvement of country roads.

XVII.

A bill was introduced one day in the legislature at Albany, to provide for the construction of improved roads in the State of New York. It was proposed that the main roads should be constructed and kept in repair by a general state tax ; that a non-partisan commission should be appointed to supervise the laying out of these roads. Some of the opposition to that bill came from farmers who said they were opposed to having the public money spent by commission. It was a foolish objection. You will pardon me if I say that the farmer is not the only honest man in the world. No man has a monopoly of virtue. Every dollar of the thousands of millions collected by the United States Government, is collected by a public officer or a commissioner ; every penny of the thousands of millions of dollars spent for government uses is spent by a public servant of some kind. Honesty is more popular than it used to be ; there is less stealing in high places. Every administration for the last fifty years has improved upon the one which preceded it, in the handling of public money. The population has been growing bigger ; public methods have been systematized ; the duties of public officers made more exacting, and the number of defalcations is so small as to be hardly worth considering. The political parties are watching each other, and are ever on the alert to find something wrong in each other's camp.

It is right that the state government should take care of the main roads just as the state governments care for the main roads in other countries. Another thing, it is eminently right that the next generation should pay something toward the expense of

constructing these roads. Your children and grandchildren will enjoy the benefits of these roads, and their property will be made valuable by their construction. Your state is practically out of debt and your public credit is excellent. You can borrow money at three per cent. on public credit, and pay for it in twenty years if you like, or one-twentieth of it each year until the amount is paid. In the larger states the farmers' portion of this burden will be exceedingly light. In the State of New York a careful estimate from statistics collected in all the counties show, that the farmers would be required to pay only about 7 per cent. of the entire cost, and that the other 93 per cent. would be paid by the incorporated cities and towns. Don't be frightened by every alarmist who screams "high taxes." Look well to your local tax, and the state assessment will never give you trouble. You are paying less taxes than any other farmer in the world, and your opportunities are the grandest. Give yourself a chance to prosper, and your taxes will become thin air. You have never really known what it is to be taxed. In 1820, when the best men of England were urging the adoption of better road laws and the building of better roads in that country, Sidney Smith wrote this sentence: "The school boy whips his taxed top; the beardless youth manages his taxed horse with a taxed bridle on a taxed road; and the dying Englishman, pouring his medicine, which has paid 7 per cent., into a spoon that has paid 15 per cent., flings himself back upon his chintz bed which has paid 22 per cent., and expires in the arms of an apothecary who has paid a license of £100 for the privilege of putting him to death." England built her roads, nevertheless. Think of that, and never again groan about taxes.

XVIII.

I think you will agree with me that your wagon roads should be much better than they are, and the main difficulty that troubles you, I believe, I can understand. You are wondering how you are to get the better roads which will give you the same advantages that are given to the farmers of England, France, Italy and other European countries.

The answer is not difficult. You are simply to insist that the main roads in your country shall be reconstructed and kept

in repair at the expense of the state at large, instead of by a tax directed against the farmers alone, and then you are to send a man to the legislature who believes in the same doctrine and will stand up for it. Don't start again at the prospect of more taxes; you are not to pay more, but less. Did you ever take the trouble to find out what a ridiculously small portion of the state taxes you pay? It will do you no harm to look it up. Send a postal card to your Secretary of State at your State Capitol, and ask him to send you a copy of the last report, showing the state taxes collected in your state. Examine this book, and compare it with your last tax receipt, and you will be amazed to find that the farmer cuts a comparatively small figure in making up these taxes. If you are good at figures, take out from the report which you receive, the value of all the taxable property in the state. Then assume that, say \$10,000,000 were to be raised for the purpose of highway improvement; that this money should be raised by state loan, payable in seventeen years; compute how much this would be for each year; divide the amount to be raised each year by the total value of all the taxable property in the state; this will give you the amount of tax on each dollar of property. Then take the assessed value of your farm, and you can easily decide what your proportion will be of that yearly tax. If you find that it costs you more than ten cents per acre of your entire farm, I shall be wonderfully in error. Now compare the amount of that tax with the time that you spend each year with your team "working out" your highway tax under the present system, and tell me which you think is the cheaper.

Consider the loss of time and energy, and the expenses of repairs and labor which the old road puts upon you. How much has your farm increased in value in the last ten years? Not one dollar. Think of this, and, if you can't do better, coax your neighbors into the desperate experiment of putting down half a mile of good, solid, smooth road, just to satisfy yourselves by a home-made object lesson.

Experience will convince you one way or the other, and if you find that, after all, good roads are a splendid investment, nail your conviction into the platform of your political party, and fight hard for that policy which best tends to develop and enrich the country—keep thinking. "Second thoughts are the adopted children of experience."

XIX.

And so I have tried to show you that to have a good road is to save, to accumulate, to improve and prosper ; for prodigality and waste are everywhere abroad, and there is no prodigal like a shiftless community. And I have written to you about the common roads, for it is high time that you should know that these roads are the most expensive of all the public property, and that for about a hundred years in the keeping of these roads you have been paying a good deal more than your share of the expense. The politicians have been making ducks and drakes of your resources at the rate of a thousand millions or so a year, and have stuck to the political dogma, that anything is good enough for the farmer, so long as his wits can be confined to the business of raising crops.

It will pay you to think of this from time to time, because it all comes down to a question between the farmer and the state, and if you bear in mind that the seven holes in your head were all made to use, you are likely to discover a big balance to your credit in the public accounts. Of course the "accounts" are more or less imaginary, but the balance is not ; and I may as well say right here that as soon as you are satisfied that the day has come when the state should begin to square its everlasting debt with the farmer, you had better strike an attitude, and extend your hand for a settlement, just after the manner of that despot down at the toll gate who plucks your dime every time he accords you the privilege of traveling the public road.

Bear in mind, too, that the common highway is the property of all the people ; that the road which passes your dooryard is only part of the great highway from Maine to California ; for I have tried to show you how it is that every other civilized nation on the face of the globe has repented its shamefaced imposition upon the farmer, and has made the care and keeping of the main country roads a direct charge upon the government itself. They have found it to be immensely better for the government, immeasurably better for the farmer, and more equitable for both. One of these days we are going to do things on the same plan in the United States, and it only rests with you to fix the time. You may hope to catch larks if ever the heavens fall, but you'll

get no help from the politicians unless you stand up on both feet and ask for it.

Besides, your average politician is not often "posted" on the question of good roads. Try him and see. Next November, about election time, when the fall rains have set in and your dirt roads have gone into their semi-annual pickle, candidates for the legislature will appear in your neighborhood, and you will find the man whose hand is like a dead porgie for nine months in the year to be the most genial fellow living. Go down to the corners, and hear him make a speech. He feels an agony of apprehension that the state is not going to do the square thing by the farmer, and he has just wallowed through twelve miles of mud to talk to you about ballot reform and the tariff on tomato cans. His poor horse is half dead with fatigue, and his buggy is pasted and clogged all over with thick mud, till every spoke is as big as the leg of a piano. Ask him what he thinks of the country roads; and whether it isn't about time for the state to take the lead in a movement to improve the main highways. Tell him that in your state bad roads on election day mean the practical disfranchisement of twenty thousand intelligent farmers, and ask him if he doesn't see how perilous it is to leave the success or failure of the stupendous tomato can question dependent on the weather.

Suggest to him that it will be time enough to settle the best way to count the ballots when a way has been provided for every voter to cast one; that a bad road is a tax on your citizenship; that every general election day sees half a million of the best farmers of this country mud-bound at home and deprived of their votes because they can't get to the polls, and ask him to extend his ballot reform movement so as to cover the entire question. It is just as important to get the ballots fully in the box as to get them fairly out of it. Every citizen should not only have the privilege of voting, but the public hand in this free republic should make every road good enough to invite all its voters to the polls on election day. When you compel a farmer to drive through 10 miles of mortar bed to cast a loyal vote you are making him pay for the privilege, and the state which does that in this advanced year of grace is guilty of a wrong.

Say all this to your political candidate. Tell him the people of this country are paying \$140,000,000 every year to support the common schools; that about \$45,000,000 of this sum are wasted because more than 30 per cent. of the pupils are kept out

of school—mostly on account of bad roads and bad weather, that the farmers are bearing the greatest proportion of this loss, and that a few miles of better roads in each county would tend to even up matters a little.

You are likely to find him bristling all over with a sedate and childish ignorance of these questions. He is fenced in by a party platform, a political handbook and a boss ; but a little common sense from the home market will do him no harm, and he will serve your interests just in proportion that you make him see that the farmer has no use for a narrow gauge politician.

But your representatives in the law-making bodies of the state and nation will be found to include many able and far-seeing men who are ready to urge the movement for better roads as soon as they are sure of the moral support of the farmer. They



know well the crying need of this improvement, but they are not sure that you know it. They will pass the laws as quickly as you demand them ; but as representatives they generally aim to reflect the popular will rather than to mould it. Few men in public office have the courage to lead.

In the departments of government at Washington the necessity for better roads is an accepted fact. The Department of State has lately received from our consuls and ministers representing the United States in foreign ports, a most interesting series of statements and descriptions respecting the improved

systems of roads and road laws of other countries, and these reports are now being prepared by the government printer for distribution. In the year 1888, the report of the Department of Agriculture contained a statement by the commissioner so timely and so forcible that I have deemed best to quote it for your benefit.

The commissioner says :

"The common roads of the country are the veins and arteries through which flow the agricultural productions and the commercial supplies, which are the life blood of the nation, to those great ducts of travel and transportation—the railroads of the country.

"While our railway system has become the most perfect in the world, *the common roads of the United States have been neglected, and are inferior to those of any other civilized country in the world.* They are deficient in every necessary qualification that is an attribute to a good road ; in direction, in slope, in shape and service, and, most of all, in want of repair. These deficiencies have resulted not only from an ignorance of the true principles of road making, but also from the varied systems of road building in force in the several states of the Union, due to defective legislation. *The principle upon which the several states have based much of their road legislation is known as the 'road-tax' system of personal service and commutation, which is unsound as a principle, unjust in its operations, wasteful in its practice, and unsatisfactory in its results. It is a relic of feudalism borrowed from the 'statute labor' of England, and its evil results are to-day apparent in the neglected and ill-conditioned common roads of the country.*

"It is a question of vast importance to the welfare of this nation that these arteries of agricultural and commercial life should receive the attention that their importance deserves, and that an effort should be made to remedy the defects now existing, and establish a system that could be made uniform and efficient in all the states of the Union.

"By the improvement of these common roads every branch of our agricultural, commercial and manufacturing industries would be materially benefited. Every article brought to market would be diminished in price ; the number of horses necessary as a motive power would be reduced, and by these and other retrenchments millions of dollars would be annually saved to the public. The expense of repairing roads and the wear and tear

of vehicles and horses would be essentially diminished, and the thousands of acres of land, the products of which are now wasted in feeding unnecessary animals in order to carry on this character of transportation, would be devoted to the production of food for the inhabitants of the country. In fact the public and private advantages which would result from effecting this great object in the improvement of our highways are incalculable, not only to the agricultural community as a class, but to the whole population as a nation."

Gladstone, who is perhaps the greatest Englishman of the century, says: "The duties of a government are paternal," and in that sentence includes the whole scheme of honest state-craft. It is this principle that pervades the road laws of every civilized country in Europe, and insures to all the people a fair and equitable opportunity to enjoy, untrammelled, the full blessings of their vocations and live their lives "in the pursuit of happiness."

What "paternal duty," my dear American farmer, does your state exercise in your behalf? Post offices? Yes; it leaves your letter at the corners, four miles distant, and permits you to wade and wallow for it. Free suffrage? Yes, my loyal friend; every year or two the election excitement gets into your borough, and you are invited once or twice a week to shoulder a torch and chase the village band through miles of slime to the tune of "Kemo Kimo" till election day comes, when, if your rheumatism lets up and the mud isn't too deep, you drive the patient old mare through miles of mangled soil to help elect somebody who is apt to serve your interests last and least of all. Schools? Yes; the red school-house is there, but your children are half the time at home in Spring and Fall because the roads are bad. Churches? No; your government leaves the religious question entirely with you, and I sometimes think when the old clergyman preaches the doctrine, "a righteous man regardeth the life of his beast," and "the prudent man looketh well to his going," that there is enough philosophy in those two texts to give you the first good lift to stronger ground.

You see, it is a kind of reform that must come from the people, and, most of all, from the farmers. It is a reform that benefits all and injures none; makes you broader and better in your person and in your possessions; helps and hastens the happiness of your family; shields and saves the patient friend that drags your wagon so many miles from year to year; puts

you on better terms with yourself and all mankind, and leaves you wondering what sort of a farmer that was who lived and labored in a sea of mire. It is a reform that is now at the threshold of your state, and one that will respond to your feeblest invitation.

THE END.

A WORD FROM THE NATIONAL GRANGE.

By Hon. Mortimer Whitehead.

Official Lecturer, National Grange of the Patrons of Husbandry.

ROADS. What a subject! How much we farmers have to do with them. Like the poor, they are always with us. When a neighbor drops in, it is first, "How do you do?" And next, "How's the roads?" At this season of the year more talked about than even the weather.

It is a lengthy subject, and it's a broad subject.



HON. MORTIMER WHITEHEAD.

A son of Erin had been to town; he had met friends, and had taken a little too much "tangle-foot"; as he went along towards home, he was seen staggering back and forth from one side of the road to the other, and not getting along very fast. He met a neighbor, and inquired how far it was to his own house. "Oh, it's not far, Pat; ye'll soon get there, the road's not long." "But," said Pat, "it's not the length av it that bothers me, it's the breadth av it."

It is a very broad subject, and that is what troubles the writer. So I will not attempt to cover all its length nor all its breadth, but just throw in a few

pointer's, a little broken stone to aid here and there, perhaps, in the great and important work of making better roads for all our land.

In the journey of life, for at least thirty years past, it has been my pleasure and pain to see and feel much of the roads in all parts of our great country.

It is now within a few days of the anniversary of Burnside's "mud march" of January '63, down in old Virginia, where thousands of the boys in blue, after horses and mules could do no more in pulling the pontoon wagons that must be gotten through



THE DISASTERS OF A MUD ROAD CAMPAIGN. GEN. BURNSIDE IN VIRGINIA, 1863.

to the Rappahannock, to build the bridge on which the army was to cross, were put on the ropes to tug and pull, and pull and tug, hour after hour, and way into the night; but they were Virginia roads, and it was no use; so after days and days of mud and rain the campaign was abandoned, and, worn and weary, we marched back to our old camps at Falmouth and beyond, and in passing saw the greetings of the "Johnnies" over the river in Fredericksburg, on a banner bearing the cheerful legend, "Burnside stuck in the mud." How much roads had to do with

the battles of war then ! How much they have to do with the battles of life now.

Yes, we have helped to build corduroy roads in war times, when it had grown cold enough to freeze the mud so as to bear a soldier's weight, and more than once we have built right over the body of a horse or mule, that had gone down to rise no more.

Thousands of Illinois farmers, and those who dwell in other prairie states, can tell of thin black mud roads, "mud up to the top rail of the fence." We have tried and tested them also. Can that ride of twenty-two miles on a gray mule in Washington County, Ohio, going down towards Belpré, on roads impassable for wheels, ever be forgotten ? Then the long, hot rides through sections of the country with sandy bottom, the wheels grinding through the sand that was ever several inches deep. Such districts have their worst roads in the Summer time. In Winter, when the sand is wet and frozen (nature's Macadam), they are much better. Then there are roads in Kentucky, and some just like them in Indiana, that follow up the creek or "branch," and often run right in the bed of the stream on the hard limestone bottom, surely "a hard road to trabble, I believe." But Kentucky has also many miles of splendid stone "pikes" in her blue grass counties, and I know that where the roads are good all the year round, there you will find the most intelligent people. They have a chance to "get together." Fine natural roads there are in some states ; straight cuts across the vast prairies, with the original sod for a road-bed ; others have shell roads, miles of them, made of oyster shells. I have been over fine roads in parts of California ; and over plank roads, and corduroy roads, and gravel roads, and Telford roads, and Macadam roads in different states ; but in their relations to the whole, and the mud holes, they are but oases in a great desert.

Here is a text for a dozen good sermons on the old subject of "Mend your ways." I have clipped it from the Associated Press despatches in a city paper, on this, the last day of the year, 1891. It reads :

"A MUD BLOCKADE IN IOWA.—A great mud blockade has existed for two weeks in the Mississippi valley. Country districts in Iowa have been virtually isolated from the larger business centres, and have lost heavily in their inability to market their products. The loss to merchants depending on the country trade, especially in the holiday purchases, has been great. The miserable situation still continues, and it is feared that numerous

failures will result among country merchants, while business generally will be seriously affected."

And the local and city papers will tell the same story of loss and inconvenience in more than ten thousand rural communities before the plows turn the furrows for next year's crops. And that newspaper item doesn't tell all the losses by reason of the mud embargo. It does not tell of the loss of life in sudden cases of sickness or accident, when the doctor's presence is so greatly needed, but delayed beyond the fatal moment by bad roads; nor of the loss of health and sickness unto death through hours of exposure to storm by reason of slow going on bad roads, when with good roads the journey could have been counted in minutes; nor of the loss of time (and "time is money"), spent in the weary plodding and splashing; nor of the loss in wear and tear of man, team, wagon and harness; the half load carried instead of full load; the loss of temper; the loss of heart, the discouragements which lead to giving up the battle. The failure of Burnside's campaign, by reason of the bad roads, was one of thousand failures endured each year by farmer and business man for the self-same cause. And that brings up one pointer by way of suggestion. As told in our text, the business man in village and city suffers as well as the farmer. Then why should not the dweller in town meet the farmer half way? And if *all* are interested why should not *all* help pay for the good roads, which will mean not only greater success to the farmer, but to all others. You cannot help agriculture in this country without helping all other interests. As it is now, the farmer bears all the expense of "working the roads"; the resident of village and city drives out during the summer evenings over good roads at that season that cost him *nothing*, and loses in business because they are bad in winter. The farmer not only pays for keeping the highways in repair, but he owns them. When he buys his farm his deed covers the land to the middle of the road. If his farm lies on both sides he owns all the road. He pays just as much per acre for the land in the road as for that inside his fence lines. And his taxes, at so much per acre, cover his land in the road as much as the rest of his farm. Therefore, I hold that as roads are for the public use—the use of all citizens—all should bear the expense of their maintenance, and taxes for road purposes should be largely, if not all, borne by the state. In ancient towns and countries, roads were built by the state, and in many modern governments it is still

the rule. Even in our own country national roads were built and maintained for years. Our great transcontinental railroad was built by the people, and for the people, by the millions of acres of the people's land given to pay for it; but "the other fellows" own it now, and tax the people at their own sweet will, while refusing to pay the interest due on their bonds, also guaranteed by Uncle Sam.

It was nearly twenty years ago when, in a gathering of farmers and others in our County of Somerset, New Jersey, near my own farm, the ever present subject of the condition of the roads came up, and I ventured the suggestion, that instead of using the thousands of dollars of "road money" raised each year, just to scoop the mud out of the ditches and pile it up in the middle of the road, making them permanently no better than they were a hundred years before, when Washington with his patriot army was at Morristown, and fed by the farmers of our county, because bad roads prevented supplies being brought from a greater distance—that this "road money" should be used to pay interest, and a part of principal of money raised by bonds to make the roads, for once and all, really good and passable for the entire year. One of our county officials, who had grown gray in his years of service in drawing fat official fees, resented my innovation on the good old ways by saying: "You will be more of a 'white head' than you are now before that will come to pass." My answer was: "It is a long *road* that has no turn." And it has been talked and it has grown in favor, and it is one way without extra burdens to the people by which we can have permanently good roads.

Of late years we have heard much of convict labor in our prisons being taught to work at trades, and at their time and services being sold out to "contractors," who use them in producing boots, shoes, and other manufactured articles, in competition with free labor and manufacturers who have to pay full wages. It is wrong in principle, and I believe all prisoners, whether for life, for years, for months, or for a day, should be employed upon some public work for the general good. And road work covers that point entirely. Let the modern stone crushers be set up in all prisons—the state can in most cases supply the raw material, and transport it to the different counties, when at county or township expense it can be carted to the road, and year by year a few miles more of good roads be built. Have

these stones crushers also at each county seat, and have the prisoners and even tramps put in a few hours each day in producing road material. Even if the county income could not bear all the expense of its distribution, there is enough co-operation now existing and growing among the farmers to give a few days time with their teams to carting the materials where it will do the most good.

Money is now cheap on good security. The two per cent. bonds of Uncle Sam are now selling at 105. Why can't we have a system of National inter-state roads, under the inter-state commerce clause of the constitution? National road bonds at 2 per cent. interest would "go," and the money could be used to build roads that would benefit city and country alike. There are many good citizens of our country that would even advocate the issue of a few hundred million more "greenbacks" that cost the people not even 2 per cent. (and the Supreme Court says they are constitutional), to be used in building these inter-state roads, and at the same time increase our per capita of circulation, and so make times better for every one.

The project is now being agitated in some quarters, that as our government taxes regulate the manufacture of whiskey, it should also regulate its sale, and so, if possible, curtail the saloon evil. In Sweden and Norway all liquor is sold in government shops or stations, under strict rules and regulations, as to number of stations, amount sold to one person or family, etc., and *all the profits go to the government*, and are used in making some of the finest roads in the world. How would that do for another way?

But enough said. Push the idea of good roads. It will take time and patience to get some people, even farmers, out of the old ruts in this as in all things. But I assure you the farmers of this country were never so wide awake as right now.

They are at school in their Granges, their Alliances and their Leagues. They are doing a vast amount of thinking. They have joined the procession. They are on the right road, and they want better roads, and they will help themselves, and help others to get them.

THE GOOD ROADS OF UNION COUNTY : HOW WE GOT THEM, AND HOW YOU CAN GET THEM.

By Charles C. McBride.

THE MOVEMENT which resulted in the system of magnificent roads now traversing Union County, New Jersey, began between three and four years ago. Prior to that time our roads at some seasons of the year were so wretched, even upon the main thoroughfares, that those citizens of the county who were on the grand juries successively presented those other citizens who were not on the grand juries, for allowing the highways to get into conditions not only disgraceful to a civilized community, but actually dangerous to life and limb. It was no unusual thing in winter to see large trucks, carts, furniture vans and the like stuck fast in the mud within sight of the largest towns and cities of the county, and afterwards frozen there so firmly that they could not be removed till gentle spring thawed them out. During the rest of the year every wet spell saw the roads more in the condition of tempered clay pits than thoroughfares between growing portions of an enterprising commonwealth. Words fail to suitably portray the bad condition of the roads before the existing magnificent pavements were laid, and if it were not that some other counties in New Jersey still have the same kind, and are considering the advisability of following the Union County example, it would be impolite to refer to them.

It can easily be understood that during the existence of such roads there was universal discontent and universal condemnation of the road district system, but how civilized people could live so long under that old and incompetent system seems now a mystery. For it was not a system, it was an absolute lack of system, which consisted in annually shoveling gutter dirt into the middle of the highway, at an annual expense of thousands of dollars in each township. And this dirt, which was the poorest kind of road material obtainable, simply worked or washed back into the gutters, to be shoveled into the highway again next year at additional expense. It was a system that insured the worst

possible roads, excepting in the best of summer and winter weather, and it has cost the taxpayers, in the aggregate, more than the best Telford pavement ever laid. The money already spent in simply shoveling dirt into the centre of the roads throughout New Jersey would have covered all the main roads in the state two or three times over with Telford or Macadam of the best quality and kept them in perfect repair from the time of the war till the present day. If this statement seems exaggerated, do a little reckoning. Count the money expended for the past twenty-five years, the taxes appropriated and "worked out," the private repairs made, the damage done by bad roads to horses, harness and wagons. It will aggregate an enormous sum, and every bit of it wasted, because it made the roads no better.

The wonder is that such a system obtained a hold upon intelligent American citizens for such a length of time, and that it is yet retained in any part of New Jersey.

To the lasting credit of the farmers, be it said, the subject of better roads and a better road system was discussed publicly in the meetings of the Union County Farmers' Club, many years ago. But the suggestions were somewhat crude and indefinite, and no practicable plan was evolved. Even the suggestions made to the State Board by Secretary Crane's annual reports did not then awaken much interest. The discussions were, however, evidences that the people were beginning to feel the urgent necessity of roads passable at all seasons of the year, and afforded assurances that the farmers were not only conscious of the advantages of good roads, but were willing to help pay for them.

The first effective agitation was commenced by the newspapers in 1888, and if this particular phase of road history seems egotistical the facts must be the excuse. The *Elizabeth Daily Journal* took up the matter with all the vigor it possessed. It viewed every phase of the subject, lost no chance to make a point against the old roads whenever they became disreputable or impassable, and rarely lacked for abundant cases in point. It took every opportunity to keep the subject before the people. In season and out of season, with all its energy, all its power of insistence, and all its persistency, it laid before the people the waste and inconvenience of bad roads, and the necessity, the advantage, the economy, the enterprise, the beauty, the progress and the civilization of good roads. During a period of nearly two years it kept hammering at this topic, never once abating its

zeal and never allowing any obstacle to stand in the way of its determination to fully arouse public sentiment on this subject. In that two years time there was scarcely a paper in the State of New Jersey that did not reiterate or in some way reproduce the *Journal's* arguments. Most of them copied many of its articles entire: a fact that is stated more to show that the newspapers of this state are already in favor of good roads, than to secure credit for the *Journal's* original articles.

The other newspapers of the county gradually fell into line. At first a few held back, fearing the distinctly local interests of the place they represented might be in some way damaged. But in the course of time they all came to be the unequivocal advocates of county roads. There is no denying, however, that a strong, aggressive, continuous and persistent lead in this agitation was a most effective element in formulating public opinion and giving direction to the utterances of the county press.

In due time the work of the *Journal* and the papers that were with it in the struggle began to tell. Good roads began to be talked about all over the county, and after nearly two years' agitation the master minds in various interested localities began to look for the practical side of the subject.

Freeholder West, of Roselle, was among the first to take active steps, and with him were immediately associated Mr. Frank Bergen, who had saved the city of Elizabeth from its financial sins, Ex-Assemblyman William H. Corbin, Assemblyman Foster M. Voorhees, Assemblyman (now Senator) Fred. C. Marsh, Comptroller A. B. Carlton, County Clerk J. L. Crowell, Senator James L. Miller, who had already caused ten or twelve miles of Macadam pavement to be laid in his own township of Westfield, together with several other citizens of prominence.

Early in January, 1889, a call was issued by Freeholder West for a meeting of conference to be held on the evening of the 10th, at the Court House, in the city of Elizabeth. Its stated object was "to formulate a definite, practicable and expeditious plan of action in reference to county roads." It was not a public meeting, but about forty of the leading and most influential men of the county were invited to be present. Among those who answered the call were representatives from all the large cities and most of the townships—cool, clear-headed men, progressive in spirit and purpose, men who favored better roads and had the ability to formulate a plan to get them. The city

of Elizabeth was represented by Mayor Rankin, ex-Congressman Amos Clark, Comptroller A. B. Carlton, ex-Assemblyman Wm. H. Corbin, Hon. Foster M. Voorhees, C. B. Vaughn and others. Plainfield was represented by Director Hubbard, of the Board of Freeholders, Elias R. Pope and Assemblyman Ulrich; Rahway by County Clerk J. L. Crowell; Westfield by Senator Miller; Springfield by Freeholder J. S. Roll and Mr. Sickley, and Linden by Freeholder West. The *Journal* was not left out of this meeting or any subsequent meeting. Eighteen of those invited sent letters approving of the movement and guaranteeing their hearty co-operation.

Two main ideas had by this time crystalized into definite form. One was that the roads must be taken out of the hands of district overseers, and the incompetent road tax system abolished. Second, that the expense of improving them must be divided, the large cities taking an equitable share. At this meeting a committee of five was appointed to draft a bill, embodying these main features in legal and practical form. That committee consisted of City Attorney Frank Bergen, Freeholder West, Hon. Wm. H. Corbin, ex-Judge Mulford and County Clerk Crowell. To these men was given a delicate and most important task, and they were directed to be ready to report at an early date, when another and more public meeting would be called for the free and open discussion of the plan they were to formulate.

The movement was now an acknowledged fact. It was no longer a mere sentiment or theory. It had tangible form and positive motion, and in this as in all other timely and progressive movements, when once it gave promise of something advantageous to the whole community it found its progress made easy.

The meeting above referred to was held on the 10th. On the 14th the grand jury came into court with a presentment against the old roads. Just at that time they were in horrible condition, and the grand jury, in pointed language, called the attention of the court to "the bad condition of the roads in the County of Union, and more especially the main roads leading to Rahway, to Plainfield and to Summit." They declared that the same were "in many instances, especially at this time of the year, almost impassable to vehicles of any kind," and they concluded their presentment by saying: "Public interests demand that these roads be repaired and put in good condition at once,

so that the people of the county may be permitted to pass over the same without danger to themselves or damage to their vehicles." This presentment was signed by Freeholder Geo. W. Doty, who was then foreman of the grand jury.

On the 15th the Board of Trade of the city of Elizabeth held a meeting, and nearly the whole of the session was given to the discussion of county roads. Francis Collingwood, who was assistant engineer in the building of the Brooklyn Bridge, was invited to present his views, which he did so effectively that the Board unanimously ordered a committee of five to be appointed "to attend the next meeting of the county road movement and to co-operate with those at that meeting."

Meanwhile the influential men in other parts of the county, and those who were compelled to travel over the almost impassable roads, were quietly but very effectively working up the matter in their respective districts, so that when the time came to hold a second meeting and the committee appointed to draft a plan were ready to report, there was no difficulty in getting the court room well filled with men who were in favor of the movement.

All who were at the first meeting were at the second, together with scores of others. Among the latter were Surrogate Parrot, Dr. Geo. C. Brown (father of State Consul G. Carleton Brown and President of the Board of Trade), Engineer Collingwood, Mayor Job Male of Plainfield, Secretary Crane of the Union County Board of Agriculture, City Treasurer John W. Whelan, and others equally prominent and zealous.

This second meeting was held on February 2d, and the bill that was then reported by the committee and finally adopted by the meeting is practically the law that is now on the statute book. At this meeting it was discussed paragraph by paragraph, phrase by phrase, and the very words were at times under fire, so intent were the citizens to have it exactly right.

As might have been expected there were as many different plans for roads as there are kinds of roads to be built. All were discussed hotly and to the point. Macadam, Telford, sand, gravel, blocks—all were advocated or objected to, but the committee's report had been so wisely prepared that any kind might be adopted to suit the respective conditions of each county in the state, while the questions of cost and how the expenses should be distributed had been so cleverly and equitably met that the

meeting failed to improve upon the report in any important particular. It was a document that has, from the moment it was completed, reflected only the highest credit upon Mr. Bergen and those associated with him in preparing it. The meeting adopted the report, slightly amended by a unanimous vote.

The next necessity was prompt legislation. The legislature was now in session, the season was rapidly advancing, and if anything was to be done it must be done quickly. And right here an obstacle arose that was not foreseen. Union County was practically a unit in favoring stone roads, but any law must, under the constitution, be general, applying equally to every county in the state. As Union County was the only one in which the people demanded these roads it was not surprising that representatives from other counties found serious objections to the bill. Assemblymen from not a few of the counties positively refused to give further powers to their boards of freeholders, preferring to take away the authority they already had. Others feared it was a corrupt scheme, and still others seemed to fear it was not. Prominent citizens of the county went to Trenton day after day and used all powers of legitimate persuasion with the senators and assemblymen, but for a long time ineffectually. Time and again the bill was laid over, because it lacked one or two votes of a majority. For a while it seemed as if these objections could not be overcome, and the work of years seemed likely to come to naught. And just here it is proper to give due credit to Senator James L. Miller, Assemblyman Fred C. Marsh, Assemblyman Foster M. Voorhees, Assembly Clerk John J. Matthews, all of whom represented Union County. They worked with steady purpose and indefatigable zeal in behalf of the bill. Politics were forgotten, and men of both parties united all their influence and energy till at length it passed both houses, albeit by a narrow majority, and was signed by Governor Green, also of Union County, on the 19th of March, 1889.

At once the Board of Chosen Freeholders took up the work laid out for them. It would be useless, though not uninteresting, to recite the difficulties they had in selecting roads for improvement. Everybody wanted the new road to run before his door, and the board had only \$150,000 to expend. But with the same caution and wisdom that had marked all the proceedings thus far the board made a careful selection of the roads it deemed most advantageous to the county, and began work upon them.

It was soon discovered that the money in hand was not enough to give the county all the roads that were demanded, and as a consequence there was much inconvenience and some delay. In the following year the legislature was again appealed to, and the law was amended so that the total amount to be expended was more than doubled. The original law allowed the issue of bonds to the amount of \$150,000, but the amendment authorized an additional issue of \$150,000, with a direct tax of \$25,000 more. And this proved enough to complete the system of roads laid out, with a mile or two in addition.

With the details of the work as planned and executed by the Board of Freeholders it is unnecessary to deal in this condensed paper. There were discussions as to methods, objections as to materials, delays caused by storms, inconveniences caused by contractors—in short there were all the incidentals that always accompany great improvements, but they vanished into thin air the instant the roads were finished, and gave place to unbounded satisfaction.

One of the distinguishing, one of the most meritorious features of the whole movement was the absolute absence of politics. The Board of Chosen Freeholders is Republican by a slight majority, but from the time the roads were designated till they were completed, every act of that board in connection with the county roads has been unanimous. The members acted with reference to what they believed to be the best interests of the county and set every other consideration aside. In the history of this state such unanimity of purpose and of official action stands unparalleled, as we believe. There was no politics in the movement when the press first agitated the subject, none when the people took it up in earnest, none when it was carried into the legislature, none when the Board of Freeholders put the law into operation. It has been absolutely free from politics, from inception to execution, and this feature is most strongly commended to those who would agitate the building of good roads in other counties.

The costs and expenses of these magnificent roads are easily computed. The total outlay of the Board of Freeholders has been nearly \$350,000, and there are now nearly 40 miles of Telford and Macadam road in the county. The figures are not in excess of what was expected by those who had given the matter careful study, thus showing that the management of the financial part

had been as discreet as the preparatory work. But the question will arise at once, has this expense of nearly ten thousand dollars a mile proved wise as well as beneficial?

Good roads are of course good things, but do they pay?

The answer may in part be found in the fact that the property in Union county has actually appreciated in value far more than the cost of the roads. And this not only in cases of sale or exchange, but upon the tax levy.

Notwithstanding the fact that \$300,000 worth of county bonds have been issued to build these roads, and the interest must be met annually, the tax rate has not been increased in the county, or in any city in the county, in consequence of the extra interest expense; and it is but fair to say that the actual appreciation of property due to the increased values of lands benefited by the improved roads meets the increased taxes already. And none of our roads has been completed for more than a year, while some parts of them only within the present month. As an advertising medium alone they have been worth what they cost, for they have brought county property into enviable prominence, have already caused the sale of many residential sites, have brought new wealth and new enterprise in the midst of us, have given direct impetus to building and improvements in every city and town touched by them, and as yet the benefits are only beginning to be realized.

It is safe to say that the citizens and taxpayers of Union county would not go permanently back to the old system with its old roads if they were paid many times the cost of the new roads.

The system in this county consists of three main lines and two lateral lines. The main lines run from Elizabeth to Linden and Rahway, five miles; from Elizabeth to Roselle, Cranford, Westfield, Fanwood and Plainfield, twelve miles; and from Elizabeth to Union, Springfield, and Summit, ten miles. These, by the way, are the very roads that were presented by the grand jury as being impassable in some seasons of the year and dangerous to animals and vehicles. From the worst they are made the best.

These three main roads branch out like the spokes of a wheel, having Elizabeth as the center, and are connected by one lateral road running from Rahway to Westfield, about five miles, and another running across the hills from Scotch Plains to Summit,

touching Fanwood, Westfield, and Springfield, about six miles. It is a system that touches nearly every city and town in the county and brings into prominence some of the most beautiful sites to be found in New Jersey, either for residences or factories.

There is another feature of this Union county system that can be touched upon but briefly. The road from Springfield to Summit forms the connecting link between the roads of Union county, the magnificent system which traverses the Oranges, Milburn and the whole of Essex county, and the scarcely less substantial roads running from Summit to Morristown and connecting with the main towns in Morris county. These three counties have a combined area of 715 square miles, the greater part of which is traversed by these magnificent Telford and Macadam roads. In all the United States there is nothing as yet equal to this grand system of the best roads to be found in America, all connected and running through some of the most beautiful sections of country east of the Alleghenies.

Our county roads have not only been a convenience to travel and a financial success ; they have been a source of pleasant education to many. It is a fact that these main lines, now daily alive with travel, were formerly used only upon necessity. A smaller proportion of the people in our cities kept horses and carriages than in any other cities of their size, because there were no convenient or comfortable drives. Thousands never saw the beautiful scenery spread in rich profusion within a few miles of their homes, because it was dangerous or distasteful to travel over the old roads. Now the magnificent thoroughfares are thronged, and people wonder at the new beauties brought to view. Many who never before thought of keeping horses and carriages now take the keenest pleasure in driving over these smooth, clean, hard roads. They find the whole county full of scenic surprises. The land is not only traversed in the north by spurs from the celebrated Orange Mountains, but rolls in gentle undulations from the narrow belt of salt meadows on the east to the Somerset county line on the west, and from the foothills of the north to the border line on the south. It is rolling ground everywhere, interspersed with hills, cut with valleys, and affording new and changing beauties at every view.

In every way our new roads have more than met the expectations of the people, and it is doubted if any Union county citi-

zen could be found who would not urge upon the people of other counties to build similar roads as soon as practicable.

It may be asked by bicyclers generally, what did the wheelmen do in this matter of securing good roads? An explanatory answer is required. As organizations they did nothing whatever, and very wisely; but as individuals, working with the others who were interested in the movement, they did all that young men could do. It is not so many years ago that a positive prejudice existed against wheels and wheelmen. It yet exists in some places. The bicycle men in Union county realized the injustice of this prejudice, but accepted the situation as it existed. They were more anxious to have good roads than to allay prejudice against themselves, and were discreet enough to allow no formal interference in the movement. They sank their organizations out of sight, avoided all official action, but joined as individuals in the good work and gave their personal energy and influence for all it is worth. Chief Consul Brown was among the first and most active in securing facts, writing to influential men, advancing arguments, and in every way that suggested itself aiding and abetting the movement for good roads. The members of the clubs were with him, and the wheelmen all stood by him, but as clubs, they made no record and asked no share of the credit that is rightly due them.

It is hardly necessary to offer advice to any who have followed this epitome of our county road movement. The line of success is very clearly pointed out by the facts. But since the promise was given, not only to tell how we got our good roads but "how you can get them," an effort must be made to fulfill that promise.

In the first place, then, get the leading newspapers thoroughly interested in their favor. This is easy work, for nearly every newspaper in the state is already committed to better roads, and whatever is for the best interests of the community they represent. Furnish them with facts, incidents, figures, arguments and clippings. You will find them willing and eager to get all that can be furnished, and they are the best possible helpers in such a cause. Get them with you at all hazards.

Enlist the best, most progressive and most influential men in the county in the movement, and begin your work at a time when it is most needed. Judicious men at judicious meetings are irresistible factors in schemes for public improvements.

You will hardly need new laws, neither is there necessity for such work as had to be done in Union county. The law is on the statute book, and the way has been made plain and easy for all counties in the state.

It is essential that an honest board of freeholders shall exist, and that no politics be introduced in the matter. It remains for each county, then, to lay out such roads as the people want improved, and, under the law, issue the necessary bonds. Some counties do not need Telford pavements, but only a dressing of Macadam a few inches in depth. Others need and can afford the Telford, and the way is open under the law to get whatever is needed. Under no conditions will it be so hard to get good roads in other counties as it was in Union county. We have made all the experiments and have settled all the essential questions of finance, of cost, of advantages and of success.

"The best way to resume is to resume," said Horace Greeley. The best way to get county roads is to go ahead and get them.

TELFORD SPECIFICATIONS.

ADOPTED BY THE CHICAGO BOARD OF PUBLIC WORKS.

GRADING.—Before paving, the street shall be graded to conform to stakes or profiles to be given by the engineer in charge, and thoroughly flooded, rammed and rolled to give it a solid bed.

Stone Foundation.—On the road-bed thus formed and compacted, a bottom layer of stone of a depth of not less than seven (7') inches in the centre, and gradually diminishing to not less than five (5') inches at the sides, is to form a close, firm pavement. The stones to be laid with their broadest side down, perpendicular and in parallel lines across the street, breaking joints as much as practicable. Each stone must have a base not less than seven (7') inches by five (5') inches, and be less than fifteen (15') inches long, and all stones must have rough surfaces, to insure a proper bond in the Macadam; after being set closely together, the stones are to be firmly wedged by placing between them stones as nearly as possible of the depth of the pavement until the whole is bound in position. Projections of the upper part of this course shall be broken off, care being taken not to

loosen the pavement, and no wedging shall be done within twenty (20') feet of the face of the work being laid. The interstices are to be filled with Macadam, firmly wedged with hammers. All stone used must be equal to the best quality of lime-stone, or stone equally as good and hard.

On the above will be laid a layer of clean, broken stone, entirely free from dust or dirt, not less than seven (7") inches in depth in the centre, and not less than five (5") inches at the sides, and the stones shall be practically uniform in quality, and as near an approach to a cube in form as possible. Each stone used in this layer shall have passed through a two and one-half ($2\frac{1}{2}$ ") inch circular hole, and no stone will be smaller than what will pass through one and one-half ($1\frac{1}{2}$ ") inch circular hole, and all stones that are wedge shape, and do not approach uniformity of measurement on their sides, shall be taken from the roads with properly shaped rakes, and no stones allowed to remain which are not sound, strong and equable in size and quality of material. The stones shall be raked into an even layer and then thoroughly flooded with water, then the fifteen (15) ton steam roller passed over them, with an occasional flooding of the pavement until the roadway is firmly compacted and solid, and given a thoroughly even surface.

The above mentioned layers, together, shall have an average depth of not less than twelve (12") inches, after being thoroughly rolled.

The above to be covered with a topping of stone screenings in sufficient quantity that, when thoroughly flooded with water, shall fill all the interstices, and will have, besides, one-half ($\frac{1}{2}$ ") inch over the whole surface of the Macadam after having been satisfactorily rolled.

The above to be covered with a topping of crushed granite, cube shaped as near as possible, which shall not be less than four (4") inches in the centre by not less than two (2") inches on the sides after having been flooded and rolled, and of a size the largest to pass through a one and one-half ($1\frac{1}{2}$ ") inch circular hole, and the smallest through a three-quarter ($\frac{3}{4}$ ") inch circular hole.

The above to be covered with a layer of fine, clean, bank gravel in sufficient quantity that, when thoroughly flooded with water, and rolled with the fifteen (15) ton steam roller, all interstices will be completely filled, and shall leave beside one-half ($\frac{1}{2}$ ") inch over the entire surface, of the crushed granite.

The above to be covered with a topping of fine granite screenings, not less than one (1") inch which, after having been thoroughly flooded with water and rolled with the fifteen (15) ton steam roller, shall leave the entire surface of the roadway perfectly smooth and solid. All depressions must be filled as the rolling progresses.

The Gutters for a width of two and one-half (2½) feet out from the curbing, to be paved with the best quality of compressed asphaltic blocks twelve (12") inches long, five (5") inches wide and four (4") inches deep to be set on the five (5") inch base, breaking joints as in brick masonry, and thoroughly bedded in clean bank gravel, which shall be thoroughly puddled, said gravel to be not less than eight (8") inches in depth, and containing no pebbles larger than one (1") inch in diameter; care must be taken to set the blocks sufficiently high, so that when rammed and rolled the top of the same will not be below the proper grade. The surface must be rammed with a heavy paver's rammer until every block is brought to a smooth, firm and unyielding bed and uniform surface. All the interstices must be completely filled with clean, fine-sifted sand, hot and dry. Block and gravel together shall be twelve (12") inches after being rammed.

JUPITER.

PRIZE ETCHING FROM "SHORT STORIES" FOR JANUARY.



WAS fo' de wah on de ole plantation what I gwine tell you, and it's 'bout a *caff*.

He name Jupiter.

Niggers darsent come in he so vig'rous. Dey ha' ter stan' at de gate and holler.

"Is de c-a-a-f-f in de y-a-a-r-d?"

Den us ha' ter gyard um in.

Ole Marster laff an' say he wouldn't take hun'red dollar fur Jupiter. Make us put 'im in de yawd ebery day *to eat grass!*

One Sunday, nigger gal all dress up spruce like, an' come in to go church wid our gals.

Jupiter 'hine de rose-bush. When she git pass he say, b-r-a-h, knock er upside down, cotch he haid in skyrrt, an' juck em offen

'er an' runned off wid de tings on he haid! Ole Marster seed it an' he done laff—deed he did—laff till he mos' fell offen he chair!



Den Miss Mattie, she allers darrin' Jupiter outen de hi' back step, she stan' an' kick her little foots 'ginst her starch petticoats, mak' um rattle, an' Jupiter say b-r-a-h, b-r-a-h! an' try to git at her—den she laff an' run in de house an'—

Jupiter he ain't forgit it!

One day Miss Mattie thought Jupiter in de cow-lot, but he jis' roun' de cornder ob de kitch'n *eatin' grass*. She dress in her flute white gown, what take mammy all mo'nin' to iun, kase she 'spectin' gemman's company, an' she tote her paissoll ober her bar haid, gwine down in de gyardin to git grapes.



Jupiter busy *eatin' grass*, but he look outen de cornder ob he eye—say b-r-a-h-h, raise he tail, an' chawge!

Miss Mattie scream, an' fling down de paissoll, hole up her dress outen de way ob her little foots, an' O man, she fly!

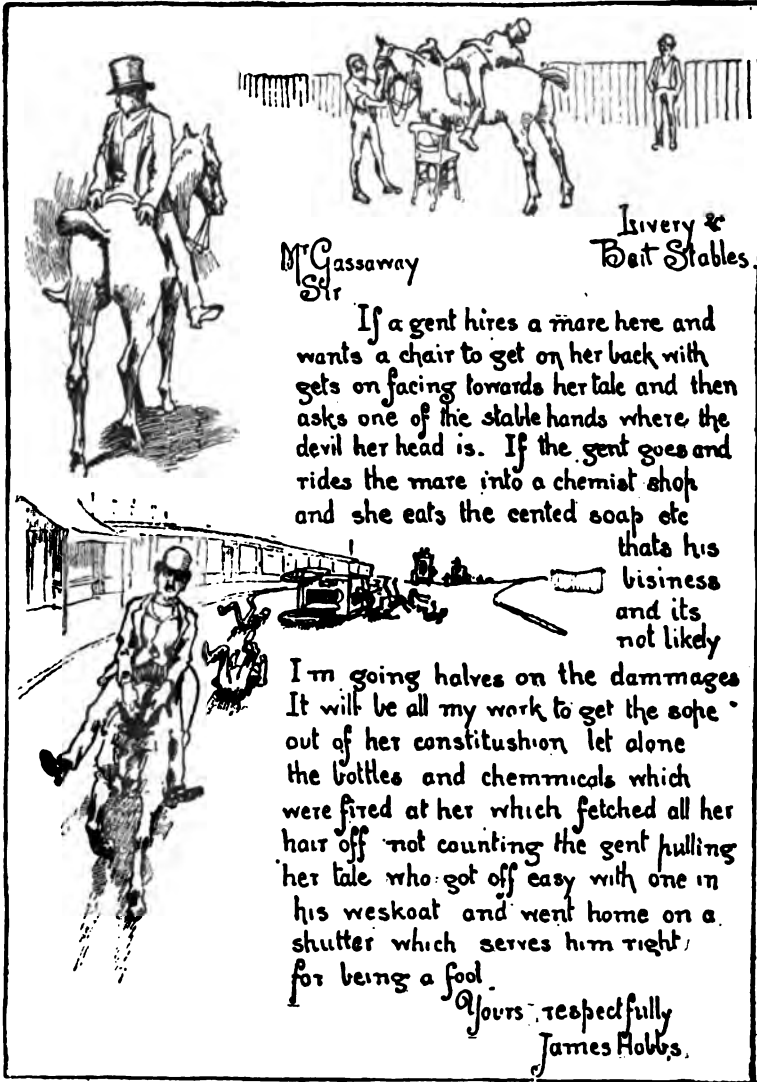
Lawdy Massy, but Jupiter he fly too!

Den he butt her ober in de tomottusses, an' ebery time she try git up he say b-r-a-h-h, an' blip her ober agin, an' she green as grass an' mad as fire when we runned him offen her.

Ole Marster laff fitten to kill hissef an' say: "Miss Mattie ha' ter hab body-gyard when she go git grapes! Ain't she dun got no nigger to tote her grapes when she want 'em?"

MR. HOBBS TO MR. GASSAWAY.

(PERSONAL.)



From January "Harness."

HOW TO WASH A CARRIAGE.

THE carriage must first be stripped of all fittings, such as cushions, carpets, etc.; the aprons and heads should be unfolded, and all the trimmings liable to be wet protected as much as possible.

Water should be applied to the panels by a hose, until the mud is entirely removed. Where a continuous supply of water is not available, a kind of small hand pump may be used with advantage to project the water on the panels. In default of this instrument, a pail or watering-can should be used, and water thrown copiously over the wheels and under carriage. When a large sponge is squeezed over the panels, the mud softens and disappears harmlessly. It is essential that the sponge be squeezed and rubbed over the panels. Great care should be taken to avoid driving water into the body and damaging the lining. The mud and dust being removed, the operation should proceed as follows :

Wash first the roof or head of the body, and wipe it with a chamois leather ; continue by washing the dasher and aprons, which are folded after being wiped dry ; then the seat boarders, floorcloth, wings and bootings of steps.

The body should next be washed ; for this, it is well to have a special sponge and chamois leather ; water should be used plentifully for every part of the carriage, but above all for the panels. Every part of the body should be carefully wiped dry.

The under parts and wheels are washed last ; each wheel must be raised with a setter, cleaned with a sponge and plenty of water, and carefully dried. The spoke brush should be prohibited in the coach-house and never used under any circumstances, as in conjunction with the dirt from the road, it acts like sandpaper on the varnish, which it quickly scratches, and then destroys the painting, the handle of the brush assisting in the work of destruction. The spoke brush is unnecessary for washing a carriage ; a sponge and an abundant supply of water are equally effective and are free from its disadvantages.

The operation terminated, the pails are rinsed ; the sponges and chamois leathers, which should not be left long in the water, are cleaned and rung out, but not so dry as to permit them to become hard when exposed to the air.—*The Hub News.*



THE EDITORS TABLE

"LET the farmer alone," writes a fault-finding correspondent, who is pained with solicitude, in behalf of the rural citizen. And then the same complaining scribe goes on with a labored statement, in which he attempts to exploit the woes and misfortunes of the farmer's life, and warns us against adding to his already gruesome position. The complaint is both gratuitous and unnecessary. No farmer has yet complained of unfair treatment at the hands of this bureau, and we count thousands of farmers among our warmest friends and supporters. But there are two kinds of farmers: one, a progressive, enterprising, and correspondingly successful class, by whom a proposition for public improvement of whatever kind is always gladly considered; and the farmers of this class may generally be counted among the thoughtful and brainy men of the communities where they severally reside. They are, in this crusade, lending their voices and influence to convincing their neighbors of the need of better roads, and to them will belong in the largest measure, the honor of that reform which the end will bring. There is another class of farmers, corresponding in character, ability and disposition, with the numbskull element which largely exists in the cities; and, making up in persistent obstinacy what they lack in character and knowledge; these farmers are the great obstructionists in the way of all kinds of social and industrial reform. They have learned the color and calibre of the American dollar, and beyond the acquirement of that knowledge, they have no use for an education in public affairs. We have seen them in squads, solemnly pacing the corridors of a great state capitol, with mournful mein and the long-drawn faces of hired mourners, waiting for an opportunity to shout their objections against a legislative bill which was intended for their everlasting benefit; and when the doors of the

committee rooms were opened for their admission, they have rushed in with the undignified haste of a galloping funeral, to present a mournful petition, the substance of which might be included in the four words, "Let the farmer alone." All this in opposition to a bill which provided for the construction of three thousand miles of excellent highway, at a moderate expense, of which the farmers would pay less than one-half of one per cent. in each year for seventeen years, and less than eight per cent. of the aggregate; the balance, of more than ninety-two per cent., being paid by the incorporated cities and towns. We should be glad to let these farmers alone, if they could be depended upon not to emerge from their hibernation till after the close of the legislative session; but, somehow, as the softening April weather invites them out to breathe the air of Spring, they seem to get wind of legislative affairs, and so they start across lots for the state capitol, to urge their objections against the improvement of roads which are even then too deep with mud to serve as ways for the common traveler. These farmers are obstructionists; but they are voters and citizens, and at whatever strain upon the public patience, they must be endured, and, if possible, respected. They know less about taxes than do their children at school, and less about roads than do the asses they drive; but their influence in the body politic is felt by the politicians and officeholders, and, as a factor in the solution of this question, they must be recognized and considered. They have undertaken to oppose the work in which we are engaged, and though their numbers are growing smaller each day, it must be remembered that they are the attacking party, and are therefore proper subjects for our ammunition. We have boundless respect for their calling, and generally for their motives, and impelled by that respect, we shall at

all times endeavor to address them with kindness, and with as much reason as we are able to command. But under the conditions stated, we cannot quite afford to "let the farmers alone," nor do they themselves desire it.

AND while we are dealing with class distinctions, we may as well say that we are gradually becoming convinced that there are also two kinds of League members, and a few letters lately received reveal to us the diverse qualities which these two classes seem to possess. One of these gentlemen, having found a subscription blank folded in the pages of his January magazine, takes on a kind of fiery indignation and figuratively tears up the sod in his mad efforts to express his resentment. He "is a League member," has "paid his subscription to the magazine," and "would have us know our business a little better than we appear to know it;" and, at all events, sufficiently well to restrain us from waving a red rag at the bull in his disposition. Another League member writes us one of those near-by, encouraging letters—a letter that makes us love him, and feel that he is one of the noble fellows who give dignity and character to the League, and keep it out of the slough of mediocrity. He incloses his postal order for a substantial sum; begs us to accept his small contribution to aid the work of the bureau; asks for a few more subscription blanks, and attaches to his letter the subscription of a neighbor, filled out on the blank which was contained in the first number of GOOD ROADS, which use, by the way, was exactly what these extra subscription blanks were intended for. We should like the wheelmen of this country to feel that they are *the* active, earnest leaders in this movement, and to give to it a little of that personal zeal and attention which serve to dignify the organization and make us proud of it. Let us forget all else except that we are men and brothers, and that by the contract of fellowship to which we have subscribed in becoming League members, we have obligations to cancel as well as pleasures to enjoy, and that the fulfillment of these obligations

tends largely to the solution of that niggardly conundrum, "What do I get for my dollar?"

THE active movement taken up by the wheelmen of the cities of Portland and Philadelphia, seems to indicate that the wheelmen of these cities are beginning to feel the value of their influence and to exert it in that powerful way which can only be achieved by organization. In some of the other cities in New York, Brooklyn and Chicago, not to mention a dozen other important cycling centres of the Union, a large number of brainy and able wheelmen may be found who might, by combining forces, exert a powerful force in the management of municipal affairs. The city of New York is spending three and one-half millions of dollars every year to maintain as vile a system of street pavements as ever cursed a corporation; Brooklyn is scarcely better; Philadelphia blushing acknowledges the possession of six hundred miles of rough cobble stones laid on the topsy-turvy plan, and improvement might be suggested even in Chicago, without much strain upon the imagination. In the management of municipal affairs, the question of street improvements cuts a very insignificant figure, simply because the people are not alive to the importance and economy of improvement of this kind, nor of the extravagant waste which a pavement places upon them. The wheelmen of Philadelphia and Portland are making a study of this question and are placing themselves in a position to force it upon the attention of the authorities and to make it a live issue in the local elections. No issue could be more important to the people, and no object could be more worthy of the attention of the wheelmen than the one here indicated. Besides all this, the wheelmen vote is growing so large, that in many important towns they hold the balance of power as between the great political parties, and this fact, while it has no bearing upon the economic value of good street pavements, is a most potent one in compelling the attention of the kiln-dried politicians. A little later we shall attempt to say some-

thing more at length upon the subject of organization in cities; but a hint dropped now may serve as good seed in a promising field. Think it over.

SHALL it be national roads, state roads, or county roads? Every scheme for legislation has its sponsor and its followers, and it is not impossible to foresee that some controversy may arise by which the adherents of one theory may condemn other propositions, under the belief that the encouragement of one scheme involves the decline of another. There should be no misunderstanding upon this point. A bill providing for state roads, to be constructed under the direction of skilled officers, need not in any manner conflict with the provisions of a law for the improvement of roads by the local authorities in the several counties, nor need any proposed enactment by the national congress conflict with either of these. Indeed, it would seem to be advantageous that two of these systems—the state and the county systems—should be planned and established for a harmonious working, which may be mutually beneficial. The state road law should provide for the improvement and maintenance of the main thoroughfares, which connect important towns in separate counties, just as the admirable system maintained in France provides for national roads between the cities and towns located in different “departments.” The maintenance of such a system by the state, would involve a constant supervision of the best roads by skilled officials, and the neglect and decay of the well-built roads, which are likely to follow the changes of strictly local management (which is too often incompetent), would be avoided. The continued excellence of the state roads would thus be insured, and at all times they would serve as object lessons to the county and town officers, in the construction of less important ones. Under the county system, ample provision may be made for the construction and repair of roads running between important towns within the same county, and as the state roads are generally divided and sub-divided into

sections, which are placed in charge of inspectors, the skill and knowledge of these inspectors could well be enlisted, and cheaply, too, to aid in the care of the county roads.

NATIONAL highways, built and maintained under the patronage of the general government, and by the skill of government engineers, might well be constructed upon those lines of travel which are most likely to be used in the emergency of war, and by the postal and other branches of the civil service in times of peace. To simplify the whole statement, that system would seem to be the best which has a well defined and rigidly framed law of the general or state government, whereby long lines of important highways may be well made and permanently maintained in good condition, and which also includes local laws and local roads, having relation to the parent law and to the main highways as branches to a main trunk. Every law, therefore, which provides for the construction of good roads, unless it be so awkwardly drawn as to interfere with auxiliary legislation, should have the public aid and encouragement.

THINGS are moving. There is a decided shaking of the dry bones of indifference, and our table is loaded with good news from all parts of the country. But best of all, everybody sends applause to the League of American Wheelmen, and bids it speed in the splendid work to which its hand is directed. We have an endless number of requests to “exchange” with agricultural and country newspapers and from many of the standard literary periodicals of the country; and it is an assured fact that GOOD ROADS will not only be a success from the beginning, but that it will engage the attention and support of the best citizens of the nation. For the pleasure of our readers, who must feel a pride in the success of the work in which we have a mutual interest, we have printed in our department “Popular Opinion,” brief quotations from the public press, and from letters received from prominent men in approval of our undertaking.

LAWS AND LEGISLATION

GOVERNOR RUSSELL, of Massachusetts, in his annual address to the legislature under the date of January 7, recommends strongly the passage of a bill looking to the improvement of the public roads. Referring to the State Board of Agriculture, Governor Russell says:

"The board, itself, should be organized into properly paid bureaus for executive work. Among its departments there might well be included one on roads, bridges and drainage, having attached to it a competent engineer. These subjects are of great importance, and affect seriously the health, comfort and convenience of all our people. The travel upon our highways, especially for long distances between centres of population, has much increased. The need of improving these highways, and of more uniform and systematic methods in their construction and maintenance, is apparent. Without infringing on any local right or power, such a department could gather and distribute valuable information on this subject, and give experienced advisory assistance on road construction and maintenance. I believe that this would lead to a more comprehensive and scientific treatment of all our highways, and to greater economy and improvement than by unaided local effort. This subject has been called to the attention of the legislature by several of my predecessors. I commend it to your careful consideration."

THE Richardson Bill, which has gained ground in New York since the first day of its introduction, two years ago, has again taken its place among the important bills before the state legislature, having been introduced by Senator Richardson on the first day of the present session. The bill appears to be substantially in its original form, and having been lost last year by only a single vote, its prospects for success should be regarded as exceedingly hopeful. Chief Consul Luscomb is carrying on a vigorous "still hunt," and, under

his administration, the wheelmen of New York are doing yeoman service to secure the enactment of this law. Its passage means 3,000 miles of splendid roads within the Empire State. Every friend of good roads in the State of New York should make it his personal duty to write to the senator and the assemblyman representing the district in which he resides, and urge upon these representatives the importance of supporting the Richardson bill.

SCHEMES for national roads improvement legislation are coming to the surface. General Roy Stone is persistently urging upon the public attention the claims of his proposed bill, and it is not unlikely that congress will consider at an early day a bill embodying General Stone's ideas. His plan for the establishment of a national school of roads and bridges is certainly a commendable one, and deserving of support.

THE Carriage Builder's National Association, at its recent annual meeting, took active steps to encourage roads improvement legislation in the several states. The association includes a large membership of influential citizens, and a committee has been selected consisting of two members from each of the larger states to prepare a suitable memorial or petition, addressed to the governors and legislatures of their several states, upon this subject of better roads. The chairman, Mr. Millard F. Lane of Philadelphia, has already outlined his committee work, and is preparing for an active movement all along the line. This action on the part of the carriage builders, adds a powerful factor of influence on the right side of this question, and we anticipate excellent and telling results.



NEWS AND COMMENT

THE Portland, Maine, *Argus* of January 19th, contains an account of a most interesting meeting of the Portland Wheel Club, held on the evening of the 18th inst., at which the subject of better roads and streets was given large attention. President Marrett opened the meeting with a most instructive address, and Chief Consul Stevens followed with an able appeal for the further progress of the movement in Maine. The best people of Portland, are now congratulating the wheel club of that city upon the intelligent and influential stand it has taken in behalf of better roads. It would be well if the wheelmen of other cities should unite in a similar way, and carry on the movement with the same zeal and vigor which they sometimes bestow in other directions.

THE New Jersey road convention was an unqualified success, and the large attendance was a most encouraging indication of the interest which the best citizens of the state are manifesting in the movement. Addresses were made by Dr. James C. MacKenzie, of Lawrenceville, N. J., Hon. Thomas H. Dudley of Camden, General Elias Wright of Atlantic City, Robert A. Meeker of Plainfield, Chauncey B. Ripley, Esq., of Westfield, Prof. Lewis M. Haupt, of the University of Pennsylvania, Charles C. McBride of Elizabeth, and others.

The permanent organization of a state road improvement association was effected, with officers as follows: President, Hon. Ed. Burrough; Vice-President, Dr. C. B. Ripley; Secretary and Treasurer, Franklin Dye; Executive Committee, First Congressional District, Hon. Thomas H. Dudley; Second, Clayton Conrow; Third, E. G. Harrison; Fourth, Hon. B. E. Tine; Fifth, A. S. Duryea; Sixth, P. T. Quinn; Seventh, E. S. Johnson; Eighth, Dr. Chauncey B. Ripley.

The New Jersey association is well equipped by precept and example for the accomplishment of excellent work, and much is expected of it.

THE growl of discontent which has been going on in Pennsylvania, because of the misery and cost of bad roads, for several years past, is beginning to crystallize. The newspapers in all the populous counties are taking up the subject, and in every corner of the commonwealth you can find "public men" holding their wet fingers in the air to discover which way the political wind is blowing on the roads question. If they will only have patience for a little while, the breeze will be strong enough, and they will have to seek a harbor or travel under double reefed sails.

SIX hundred cyclers attended a mass meeting of the Wheelmen's Street Improvement Association in the Century Gymnasium, No. 1,606 North Broad street, last night. Isaac B. Potter, of New York, chairman of the Roads Improvement Bureau of the League of American Wheelmen, made an able address on the need of better roads and the best means of securing them, and sketched the work done by the League in the interest of good roads.

A committee of the Citizens' Municipal Association was present, and as their representatives, Rudolph Blankenburg and Herbert Welsh made addresses in the interest of better municipal government, and the advance of street and other improvements. It was decided to aid in every way all movements looking to better street paving, but at the same time to retain the independence of the organization by allowing only wheelmen to join the association. The officers were instructed to proceed to form a permanent organization.—*Record, Philadelphia, Pa.*

MUCH work is being done in a quiet way for the improvement of country roads in the state of Illinois. It is true that the wheelmen are at the bottom of it, but it is also true that the farmers of this state

have become interested, and the promoters in Chicago are quite hopeful of success.

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It is proposed to ask the legislature to establish a board of road commissioners, who will be more than mere names and who will take an active interest in their work. This board should have the power on making special assessments on counties and using the money to repair the roads of that county, or if necessary to build new roads when the county has, for the most part, only dirt roads within its boundaries. Through the missionary work of the wheelmen the farmers of Illinois are beginning to find out that an investment of \$1 in good roads saves the waste of \$3 involved in the possession of highways no better than the average country road of Illinois.—*Post, Chicago, Ill.*

A MOST pointed and practical way of bringing to light the evil of the dirt roads system has engaged the attention of Mr. C. R. Zacharias, the live roads improvement man of the Asbury Park, N. J., wheelmen. He has corresponded with the clerks of Monmouth County towns for the purpose of learning what amount of money has been expended on the roads in that county within the last ten years. By this means he has been enabled to compile the following table:

Upper Freehold	\$30,000 00
Millstone	15,800 00
Manalapan	13,423 08
Freehold	23,000 00
Howell	28,500 00
Atlantic	9,000 00
Matawan	7,810 90
Neptune	31,000 00
Ocean	92,000 00
Wall	37,000 00
Eatontown	21,500 00
Middletown	33,500 00
Shrewsbury	7,850 00
Holmdel	11,500 00
Marlboro	10,000 00
Raritan (estimated)	20,000 00
Total	\$433,883 98

Commenting on the showing made by these figures, the Asbury Park *Journal* says:

"These figures will bear a careful study. No stronger argument is needed for a cessation of such wilful waste of money as now goes on every year in the several townships. Put the money into stone roads. Commence now. Build a mile or two a year. Then the figures in the next decade will represent a solid investment instead of useless waste."

The work of Mr. Zacharias supplies an excellent suggestion to the wheelmen of

other counties. Go to the town officers of your several towns and find out how much money has been sunk in mud in the last decade and send the figures to GOOD ROADS. We shall be glad to publish them.

FOR a time the farmers, who are the class most interested in the condition of country roads, were inclined to feel annoyance at the agitation in favor of improvement of roads which has sprung up. They suspected that it was merely a demand from dudes on bicycles. But the farmers are coming to perceive, we think, that their own welfare is as much concerned in good roads as the pleasure or profit of any class of city residents. The question is one of travel and traffic between town and country and between different parts of the country. To make this traffic and this travel more easy, is to benefit the nation materially, socially and intellectually, the rural population included.—*Standard, Syracuse, N. Y.*

GOOD roads mean good business and good homes. The weekly trade reports of Dun and Bradstreet and others regard the weather and its effect upon roads as one of the great factors in distribution. If the soft roads are sticky the farmers do not drive to market. It's a simple matter for each individual farmer; but, if half a million or a million farmers are affected by the same cause, it is a very serious matter for business.—*Courant, Hartford, Conn.*

THE legislature ought to take hold of this vital question and do something, require the people everywhere to do something toward getting good roads. And city councils ought to start brick paving of streets in cities. It is the coming road—brick is. The bare idea of a town having no bottom, and requiring four horses to pull an empty wagon! Could thriftlessness and imbecility farther go?—*Press, Washington, Iowa.*

WITHIN the last few days complaints of bad roads in all parts of Allegheny county have been multiplying. The farming element that is to be seen every day up at the Court House give the most authentic accounts of the effect of last week's damp weather upon the highways. They tell about double teaming already, while several were heard to declare that their horses

had been out on the road for the last time this winter.

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The main thing is to secure a practical demonstration by examples of durable and solid roads. When such roads can be found in every county the farmers will very soon convert their opposition into an urgent demand for the universal extension of such highways.—*Dispatch, Pittsburgh, Pa.*

GOOD roads in his township will benefit the farmer more than he ever dreams of.

On an average, the farm products of this country must be hauled by wagon eight miles to market. There is more room for saving in this wagon haul of eight miles than in a railroad haul of one thousand miles. The railroads of the country charge only eight-tenths of a cent for hauling a ton a mile.

There is abundant evidence that if the average earth highway were made into a good gravel road the same horse-power could draw four times as great a load as now.

The people of Montgomery county occupy an advanced position on almost every subject of public interest. They cannot afford to rest content any longer with the system of road repair which is becoming obsolete in every progressive district. There is no better time than the present to make a determined effort for real improvement. Now is the time to begin the good work. A score of townships it is to be hoped, will do so the coming season.—*News, Westchester, Pa.*

WITHOUT doubt many of the road supervisors intend to render full value for the money they receive. A large number evidently do not commit themselves to that extent. Irrespective of results, a law that permits the same official to be treasurer and auditor of a public fund, to audit his own accounts, draw warrants upon himself, present them to himself and receive the amount from himself, may suit that individual but is hardly in keeping with other laws for the production of public good. In many localities the strife for this office, which at best should pay no more than fair wages for a day's work, is the very best evidence that its early extinction is ardently desired by the traveling public. On the inefficiency of the present system there can be no honest disagreement, nor any on the deplorable condition of our highways in consequence. A thorough consideration of the matter in the direction of reform will, without doubt, bring

relief from this legislature, as did the rebellion on the school book question from the last.—*Tribune, Minneapolis, Minn.*

IN the battle of the road materials, wood holds the field—at least in the large parish of Kensington, where the official surveyor tells us that 200,000 square yards of wood blocks are down, being the entire area of the streets, except some thousand square yards of asphalt. Various sorts have been tried—fir deals, beech, jarrow, and even oak; also various methods of laying. The present wood paving is laid on a foundation of concrete, composed of six parts of Thames ballast to one of Portland cement. This is worked to a perfectly smooth face, on which, when it is hard, the wood blocks are laid in transverse rows. The pleasantest road to travel on and the easiest to maintain is a well-formed gravel road; but this is out of the question beyond a certain traffic point. In Mr. Weaver's opinion wood is at present the best of all paving for the main roads of a district like Kensington.—*London Daily News.—Sunday Herald, Chicago, Ill.*

PUBLIC ROADS IMPROVEMENTS.—The legislature, which meets a week from tomorrow, cannot do a more substantial service to the state than by maturing and passing a road law that will enable the counties to put their thoroughfares in proper condition. To do this it will be necessary to create a committee of the best material in the legislature. Men should be placed on it because of their sound practical sense, their experience and their genuine interest in the improvement of country roads.—*American, Baltimore, Md.*

OUR DISGRACEFUL ROADS.—In spite of the wonderful commercial and industrial progress of the United States we are still, to a large extent, using the same soft, dusty, muddy country roads that served for our remote ancestors. No organization has done more to remedy this surprising state of things than the League of American Wheelmen; and its secretary, Mr. Isaac Potter of New York, has a word to say in the November *Forum* about the evil and its cure.

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It is to be hoped that Mr. Potter and his co-workers will succeed in rousing our rural communities to the disgrace of a condition of things which make us the laughing stock of European travelers in this country.—*Sentinel, Indianapolis, Ind.*

POPULAR OPINION

GOOD WORDS FROM THE PUBLIC PRESS AND PUBLIC MEN.

"The League of American Wheelmen has performed a public service."—*N. Y. Sun.*

"GOOD ROADS is the name of a monthly magazine which has just been started, under the management of the League of American Wheelmen Roads Improvement Bureau. Its managing editor is Mr. I. B. Potter, whose excellent and valuable pamphlet, 'The Gospel of Good Roads,' we have commented upon on a previous occasion. * * The first number is a handsome publication of about fifty pages. * * Every person interested in the question of improved highways ought to subscribe for this magazine, and thus help forward a worthy and public-spirited enterprise."—*New York Evening Post.*

"GOOD ROADS is the title of a new monthly magazine issued by the League of American Wheelmen Roads Improvement Bureau, and published in New York. * * The first volume is a gem, and few unprejudiced men can read it without becoming infused upon the subject. * * A hundred or two copies distributed monthly for a year in Madison County, would vastly enlighten our people upon the subject and direct their attention to its very great importance."—*The Weekly Times, Jackson, Tenn.*

"Under the auspices of the League of American Wheelmen, a new monthly publication has been brought out. It is very appropriately called GOOD ROADS, and the man who conducts it is Mr. I. B. Potter, of New York. * * If the League and managers of GOOD ROADS desire to do good work with their organ, they should see that it reaches the farmers throughout the whole country, and the members of the legislatures. The literature of the League has been so scattered that it has been taken up and noted editorially by many of the great daily papers of the country. * * The illustrations are half-tone, and the contrast between the roads of the older countries and those in the United States are calculated to make an American blush."—*Chicago Post.*

"GOOD ROADS is the title of a new monthly magazine published by the Roads Improvement Bureau of the League of American Wheelmen, and devoted to the improvement of the public roads and streets. GOOD ROADS will publish during the coming year, a number of serial articles pertaining to this subject. The magazine is one that should interest all those who ride in carriages or on bicycles, and especially street superintendents and farmers."—*The Tribune, Framingham, Mass.*

"We have received No. 1, of Volume 1, of GOOD ROADS, an illustrated magazine published in New York

by the League of American Wheelmen. Its name indicates its purpose and objects, and as it is exceedingly well edited, it will probably do a great deal of good."—*The Times, Richmond, Va.*

"GOOD ROADS are what we all want. The question is, how shall we get them? One sort of GOOD ROADS can be had by subscribing to the publication of that name. * * Though this little monthly has but just reached its first number, it promises to make a goodly impression on the people, of the poorly constructed roads, through the information it brings to public affairs."—*The Breeze, Cape Ann, Mass.*

"The members of the Columbia Cycle Club, composed of the bicyclists of this city, have shown, by practical demonstration, their belief in good roads. Last week they sent a contribution of \$13.35 to the Roads Improvement Fund of the League of American Wheelmen. Mr. I. B. Potter, Editor of GOOD ROADS, a monthly magazine devoted to the subject of highway improvement, writes that the Columbia Club is the first in the United States to make such a contribution. Good for our boys!"—*Herald, Columbia, Mo.*

"The first number of GOOD ROADS, the new monthly publication of the League of American Wheelmen, justifies all the promises that we made for it. The cover is attractive and the contents are most interesting, not only to wheelmen, but to every taxpayer in the country. Its aim is most laudable. May it succeed in accomplishing beyond its fondest hopes."—*Central New Jersey Herald.*

"The systematic crusade which has been inaugurated by the League of American Wheelmen for better roads, promises to yield important results. The *Journal* has upon its table a little volume issued by this organization which is crowded upon its cover with sermons upon this subject. * * The argument is complete and convincing. * * The American farmer and business man can see at a glance that good roads are no more costly than bad ones, and that it will pay to inaugurate a system of good roads in every State of the Union. The League is doing a good work for the farmer, and deserves the fullest measure of success in its present campaign."—*Nebraska State Journal.*

"The interesting style in which the work is written, the confidential yet critical relationship of the author with the 'American Farmer,' and, as much as anything else, the contrast shown in the subject matter the illustrations, make the publication exceptionally readable."—*Bradstreet.*

"The first issue of GOOD ROADS has been received. It is published by the League Roads Improvement Bureau. * * * GOOD ROADS will be of incalculable value to the public in general. GOOD ROADS is gotten up in good style, and contains a number of illustrations of good and bad roads throughout the country. The objects of the magazine is laudable, and is of interest to both those who ride and drive a wheel."—*Sunday Times, Memphis, Tenn.*

"We have lately received the initial number of a publication entitled GOOD ROADS, edited by Isaac B. Potter, New York, and published by the League Roads Improvement Bureau. If the succeeding numbers are as handsome and interesting as the first, we bespeak for the magazine boundless success. It is finely illustrated and contains fifty pages of reading matter. It is a monthly magazine devoted to the improvement of roads and streets. If there is anything the farmer should be interested in for his own good, it is the matter of better roads. It would be well for every farmer's organization in the country to send for sample copies. The price for the publication is two dollars a year, or twenty cents a copy."—*Leader, Hillsdale Mich.*

"I am in hearty sympathy with the objects of the League, particularly the improvement of the common roads of the country, and send best wishes for the success of the movement inaugurated by your association."—*Hon. Levi P. Morton, Vice-President of the United States.*

"I congratulate you very warmly upon the success you have so far achieved in your efforts to organize a concerted movement in favor of this, a much needed reform. Unquestionably the present unsatisfactory condition of our American highways causes the country, and especially the rural population, heavy loss, and it would give me pleasure to do anything in my power to abate this evil."—*Hon. Jeremiah M. Rush, Secretary of Agriculture, Washington, D. C.*

"I am very much gratified that you are extending this work into every state, as I think there is nothing now so much needed as good country roads. I know in my own state a great deal of money is expended every year with little or no improvements, because it has not been expended under proper guidance."—*Hon. William B. Allison, U. S. Senator from Iowa.*

"Your enterprise is certainly a very laudable one, and I am ready to aid in any way that I can, for I believe that there is no quicker and surer way of benefiting farm life and bringing it up to an equality with that of towns."—*Geo. Austin Bowen, Master of Connecticut State Grange.*

"I am glad to hail this undertaking of your body. It is one of the many new and remarkable developments of the time. It is but a few years since I saw the first bicycle on Pennsylvania Avenue and put it down as a wild plaything. It has not only become a common vehicle here, but throughout the country; and your League, having for its purpose the double

object of improving that service, and also the far greater one of improving the highways of the country, is an outcome of this small beginning. I rejoice at it. I wish you all success, and whatever little I may be able at any time to contribute to that success, I shall be glad to render."—*Hon. Henry L. Dawes, U. S. Senator from Massachusetts.*

"I am in thorough sympathy with your work, and with the purpose you seek to accomplish by your publication. I have already in my inaugural address touched briefly upon this subject, after consultation with Mr. George A. Perkins, the head of the League here, and correspondence with Col. A. A. Pope."—*Hon. William E. Russell, Governor of Massachusetts.*

"I am most heartily in favor of good roads, not only, or chiefly for the passers over them, but for the economic welfare as well as pleasure of the whole community. If the great body of farmers, and miners, and merchants, and all others engaged in the business of life would stop to see how much money could be saved each year in the wear and tear of animals and vehicles, by having good roads, they would be a glad tax-paying for that purpose. If in this place, where I am spending the winter (Aiken, S. C.), the authorities should—as unhappily for the people they do not—make good, passable roads for a few miles about this small city, and it should come to be known that here really good roads existed, the whole community, for a far greater distance than the good roads went, would get back their taxes ten times over in less than three years. At present it would seem that the Romans—in a degree the English—and the Swiss, and a few communities in New England and New York, have understood how certain it is, that in a mere tax point of view, it is better to have a good permanent road made than a poor one of sod or mud. In our own state, I have the best of reasons to believe that, if the roads in our beautiful mountain passes and valleys were made smooth, the influx of summer visitors and residents would be ten-fold what it now is; and they would bring to every man who works and has commodities to sell a quick home market at best prices. I sincerely believe that if it were known that there were one hundred continuous miles of really good road in our dear mountain state there would be each year \$100,000 of net income to the people more than they now have."—*Hon. George F. Edmunds, U. S. Senator from Vermont.*

"So much has been written and so well said on the subject, that even if time permitted of my complying with your request, I doubt very much if I could add to the real value of your contributions. Every one is, or should be, interested in the improvement of the highways. The State of New Jersey has taken advance steps, and will continue in the beneficial work."—*Hon. John R. McPherson, U. S. Senator from New Jersey.*

"In a general way, the roads of a country measure the substantial progress made by it in civilization. One can scarcely exaggerate the importance of having good roads especially in the United States. Perhaps more depends upon this, to all classes of people, than any other agency that plays a part in our trade and commerce. Of late I have been thinking that the states

could wisely issue bonds for the purpose of improving the country roads. Under a proper system I do not think any expenditure of public money would give so large a return to so many people."—*Hon. Stephen B. Elkins, Secretary of War, Washington, D. C.*

"The enterprise you are engaged in is one of the great civilizers of the age, and I trust that you may meet with that success which your earnest and systematic efforts are clearly entitled to. In the way of good roads we are behind many countries of the old world, and it is our duty to make up for lost time and put ourselves in the front rank of the most civilized nations."—*Hon. Knute Nelson, of Minnesota.*

"I will send you in a few days the article which you request, and which I hope may be of service, taking the position that what we need now is the general diffusion of ideas on the proper mode of making and repairing country roads. I trust that I can be of some service in this connection, as I mean to suggest in this article that this matter of road making be taken up by the University Extension Committee of the Board of Regents, and that wherever a number of people sufficient to make a local centre are interested to know about road making, a course of instruction be instituted there on this subject, and I will suggest in the article I propose sending you that some formal application be made by your body to the Board of Regents, so that the matter can be referred to the University Extension Committee, and such active co-operation instituted as may be, I hope, of very decided benefit."—*Hon. T. Guilford Smith, Regent of the University, Buffalo, N. Y.*

"Your cause has my genuine interest. It is now being mooted actively in Delaware by the grange, farmers, institutes, etc. I know too little about the subject to be able to contribute anything of particular importance, but have referred your letter to my brother, Mr. John C. Higgins, of Delaware City, Delaware, who is making it a matter of special study and agitation, and who, as Master of the State Grange of Delaware, made some interesting statements in his annual address last month, an extract from which I think it would be interesting to print. He can perhaps keep you in line with those interested in the subject in Delaware. With my best wishes for your success, I am very truly yours."—*Hon. Anthony Higgins, U. S. Senator from Delaware.*

"I fully appreciate your labor in attempting to improve the highways of our country. There is hardly anything more useful or more needed."—*Hon. Justin S. Morrill, U. S. Senator from Vermont.*

"There is no state in the Union in which the necessity for the improvement of country roads is greater than in Oregon. The alluvial soil of the valleys of Western Oregon and the long continued rains make the roads in the winter season almost impassable.

"I have been thinking on the subject for the last ten years, and intending to give it careful attention, with a view of suggesting some plan that would secure for the state a system of highways which would meet the requirements; but since I have been in the Senate there have been so many matters of importance to the Pacific Coast and to the country at large, that I have never been able to take the matter up for serious investigation and consideration."—*Hon. Joseph M. Dolph, U. S. Senator from Oregon.*

"I have read your article in the November number of 'The Forum,' and to-night I find in my mail two pamphlets devoted to the improvement of the public roads. I have not been able to do more than glance at the pamphlets and only write now to extend to you the right hand of fellowship in a question fraught with greater importance to the people of this country than any domestic question to which the attention of the country can be directed. Ten or fifteen years ago I wrote a series of articles to the *Charleston News and Courier*, on the subject of our public roads, in which I endeavored to point out the necessity of improving them. By correspondence, I procured the road laws of many of the states, and hoped to induce the Legislature of my state (S. C.) to take the subject up and address itself to the importance of a new and better system of road working. I regret to say my efforts were ineffectual. I wish I could lay my hands on these communications, but I cannot. They have been mislaid, perhaps destroyed, to make way for the multitude of other matter which has constantly engaged my attention in my official work. * * I want you to command me in whatever I can do in furtherance of the great movement to which you appear to be much interested. Congress has no authority to take cognizance of public road improvement in the states, but the states themselves may be induced to adopt acceptable methods in giving to their people better highways.

"The subject is worthy of the gravest and most earnest consideration."—*Hon. Matthew C. Butler, U. S. Senator from South Carolina.*

"I am very thoroughly, I may say enthusiastically, in sympathy with this movement, having traveled extensively abroad and knowing how very far behind most European countries we are in the character of our roads, and having suffered personally in farm life in the west from the condition of the roads there."—*Dr. C. V. Riley, Entomologist, U. S. Dept. of Agriculture, Washington, D. C.*

"I appreciate the importance of the movement looking to the construction and maintenance of better roads, and have often spoken of it in years past."—*Honorable Oliver H. Platt, U. S. Senator from Connecticut.*

"There is no more important subject than the one in which you are specially interested."—*Hon. Arthur P. Gorman, U. S. Senator from Maryland.*

QUERIES AND ANSWERS

"ESPER."—Your inquiry concerning our reason for publishing "THE GOSPEL OF GOOD ROADS" in the early numbers of this magazine, is similar to that received from several other readers, and we are glad to reply. The original edition of this pamphlet numbered but 10,000 copies, and the demand has been so great that three times that number would scarcely supply it. The pamphlets are expensive, and besides the first cost, the charge for mailing (4 cents each) makes up a large sum in the aggregate. To avoid this large expense, and at the same time to supply the demand as fully as possible, we decided, though with some reluctance, to reproduce the pamphlet in these pages.

"F. M. G."—We cannot undertake to state in these columns our personal judgment of the merits of different rollers and crushers employed in making "Macadamised roads. We have sent your name and address to three responsible concerns, and you will receive their circular information in due time.

"M. M."—If the best men of your town are already interested in improvement of roads, your work of organization will be greatly simplified. We suggest that you confer with the prominent representative men, who will assist you in this matter, and get them to join you in issuing a circular calling for a meeting of the citizens of your town. State in your circular the importance of the movement and the object of the meeting. Have a few speakers (you can easily select these from your knowledge of the people about you) and supply them with pamphlet information before the meeting. Have two or three preparatory talks with your co-workers, and prepare resolutions, and, if necessary, a petition to the legislature for an amended law. If you find that your county and town officers under existing laws (which you had

better examine carefully) have greater power to improve the roads than they are now exercising, your resolutions should be directed to the development and exercise of those powers. Only the most general suggestion can be made here; but you will find after your work begins that one movement will suggest another, and practical ideas will be supplied as your work progresses.

"FOSTER."—Cost of quarrying depends upon so many conditions that you cannot get a reliable estimate except after personal examination by a contractor or a practical engineer. If your quarry has never been "opened" this cost may include the expense of stripping, clearing and laying bare the rock. The upper stratum is likely to be found softer than the underlying strata, but it could be utilized, if not too soft, in filling drains and as sub-pavement in Telford construction. The expense of getting out the stone will depend on its hardness, the thickness, and dip of the strata, and very largely on the machinery employed and the expertness of your employees. You had better consult a local engineer.

"FARMER JOHN."—We have none of the reports you name remaining on hand at this office. You can probably obtain them by addressing a letter to the Secretary of State, Washington, D. C., and describing the public documents you want.

"F. G. S."—Our space in this department of our columns will not permit us to give full specifications for the kind of work you have in view. We shall reply by letter at an early day. Specifications for all kinds of road work will be published in GOOD ROADS from time to time, and it is not improbable that they will afterward be printed in separate pamphlets for general distribution. We mail you printed specifications of actual work which may be of use to you.

BORROWED WIT



DON'T SEND VERBAL ORDERS.

I told Hezekiah to tell Widow Gray
To tell Mother Brown, next door
To tell Dicky Dwight, who goes that way.
To tell Deacon Barnes, at the store,
To tell the old stage-driver, Timothy Bean,
To come for me sure, and in season;
But I've waited all day, and no stage have I seen;
Now, what do you think is the reason?

WHY is a hand organ like the setting sun?
Because the Dago's with it.

ONE of Travers' best *bon mots* was inspired by the sight of the Siamese twins. After carefully examining the mysterious ligature that had bound them together from birth, he looked blankly at them and said: "B-b-br-brothers, I presume?"

THE DISCOVERY.

When old Columbus with his ships
About America hovered,
Each Indian maid with sprightly grace
Skipped from the surfy bathing place,
And cried, with wonder-stricken face:
"Great Heavens! We're discovered."

—Chicago Light

"ARRAH, me darlint," cried Jamie O'Flannigan to his loquacious sweetheart, who had not given him the opportunity to "get in a word even edgewise," during a two hours' ride behind the little bay nags in his oyster wagon, "are ye afther knowin' why your cheeks are like my ponies there?" "Shure and it's because they're red, is it?" quoth the blushing Bridget. "Faith, and a better raison than that, mavourneen. Because there is one o' them aich side a waggin' tongue."—Exchange.

A BLANK.

The deuce take Adam and that apple!
His appetite he could not check,
And we the consequence must grapple—
He gave it to us in the neck!

—Puck

SAD-EYED COMPOSITOR: Wot genel-man can spare me a few quotes?

Foreman: See here, slug 13, that's the sixth time you've asked for quotes in five minutes. Whatcher setting, anyhow?

Slug 13—Well, the rules of the paper says quote all slang, and I've got a take of the baseball editor's copy.—Chicago Times

SHE sent him a kiss in her letter
Two thousand miles away!

And the dead-letter clerk paused to take at his work
That kiss that went astray.

—Puck.

THERE is in St. Paul a certain preacher of Hibernian antecedents, who considers himself to be in direct communication with the well of English undefiled, and is generally credited with the possession of as rich a brogue as can be found anywhere in Tipperary. Some mention was made of his peculiar pronunciation at a church meeting, which greatly angered him. He immediately called upon one of his leading parishioners, and, after complaining of the injustice done him, asked him whether, in his opinion, a single trace of the brogue was to be observed in his speech. "Well," his friend answered, "if you wish to deny it, I should advise you to do so in writing."—Argonaut.

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SOCIETY."

GOOD ROADS

VOL. I.

❖ MARCH, 1892 ❖

NO 3.

An illustrated monthly
magazine devoted to
the improvement
of the public roads
and streets



"Bad roads cripple and kill teams,
make half loads a necessity, and, in a
thousand and one ways, rob and cheat
the farmer."

Jackson (Tennessee) Board of Trade.

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ISAAC B. POTTER

Managing Editor

PUBLICATION OFFICE
POTTER BUILDING NEW YORK

PUBLISHED
BY THE

LEAGUE ROADS IMPROVEMENT BUREAU

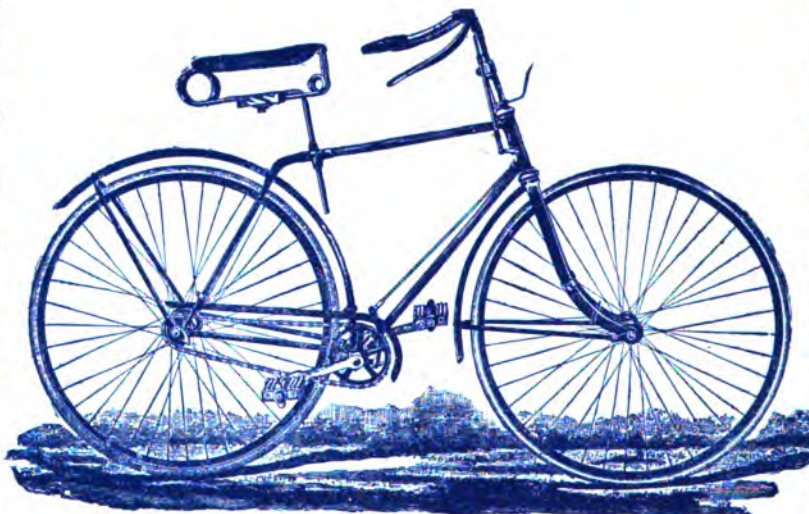


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GOOD ROADS.

Vol. I.

MARCH, 1892.

No. 3.

A PLEA FOR BETTER ROADS.

By Hon. Joseph N. Dolph, United States Senator.

BLAZED routes through forests and trails across prairies answer the wants of a savage and barbarous people; but, in civilized countries improved roads are of prime necessity. The better the roads, the less the cost of transportation and travel, the more valuable the products of agriculture and the less costly to the farmer are his necessary supplies.



HON. JOSEPH N. DOLPH,
U. S. SENATOR FROM OREGON.

The inhabitants of sparsely populated regions must, of necessity, submit to the inconvenience of poor roads; but as the country becomes more populous, and the area of cultivated land is increased, and the product of human industry multiplied, with the augmented wealth that these conditions induces, the roads can and should be improved and perfected. There is no reason why every thickly settled and productive region in this country should not be supplied with good roads. Improved roads benefit all classes of people and stimulate every branch of productive industry.

In most cases I am satisfied that the reason why the roads in this country are not better, is not that the necessary cost of construction and maintenance is beyond the ability of the people, but that it is the indifference of the parties interested, the failure in some instances to properly locate the roads, the lack of intelligently devised

plans for their construction and improvement, and the extravagant use of funds raised for the purpose.

In the matter of farm roads this country is greatly behind all the principal countries of Europe ; and in the transportation of farm products to the local market or railroad station, our farmers labor under a great disadvantage in comparison with the farmers of Europe. As has been said: "we are at least one hundred years behind Europe, and about twenty-four hundred years behind Rome in this important matter." In many portions of the United States our country roads are absolutely impassable at some seasons of the year ; and there is hardly any portion of the country where improved roads, roads located on the most direct lines of travel, with proper grades, and smooth, hard surfaces, which would not be cut up by the wheels of vehicles in summer or become muddy in winter, would not save at least one-half in time and expense of transportation.

The construction of good roads requires a large outlay of money. The system of macadamized roads lately constructed in Union and Essex Counties, New Jersey, cost \$10,000 a mile, and these roads are probably not as substantial as most of the improved highways in Europe. The roads constructed by the Romans were much more elaborate, durable and expensive. Disregarding all obstacles, the Roman roads were located upon the most direct line between the points to be connected ; ditches were dug on each side, and the soil removed until a firm foundation was reached and the soil replaced with solid, durable materials ; the lower layer of the road-bed consisted of large flat stones, if obtainable, if not, the layer was composed of other stones laid in mortar. Next came a layer of small stones and concrete ; a third layer of finer concrete ; then the surface layer, composed of stones of several angles joined neatly together ; the whole constituting a road-bed of from three to seven feet in thickness.

No good road can be constructed without adopting, to some extent at least, the plans of these ancient roads. Location upon direct lines, as nearly as possible ; minimum grades ; an elevated road-bed, higher in the centre than at the sides, so as admit of quick drainage ; ditches to carry off rapidly the surface water, removal of the loose soil and the substitution of solid material, so laid as to furnish strength and support a surface of hard material which will not become mud in wet seasons, be

cut into ruts, or be ground into dust in dry seasons, are indispensable.

Great national highways, connecting the great cities of the United States and extending from one extreme boundary to another, have been proposed, something like the famous roads constructed by the Romans before the Christian era. But times have changed : Transportation and travel, and the movement of troops between distant points is now by railroads. The present want of improved roads is for the purpose of reaching these modern means of transportation ; not roads parallel with the great lines of railway so much as roads radiating from railroad stations and extending into the country tributary to railroad lines.

Some writers upon the subject indicate a belief that the question of improved roads is a matter of national concern, and that congress can originate or aid in the work of building them. To facilitate the transportation of troops and munitions of war, and to make new regions accessible, congress has, by subsidies of land and by appropriations of money, aided in the construction of wagon roads. Liberal appropriations are made for roads to national cemeteries, to light-houses and government reservations and buildings. The necessity for military wagon roads, owing to the construction of railroads, has decreased, and I do not perceive how congress can greatly aid in securing a system of improved highways in this country. Our government differs from those of most of the European countries in that ours is a dual government ; a combination of national and state governments ; the powers of the national government being limited to those granted, in express terms or by implication, by the federal constitution. The construction of roads and their maintenance are matters mainly of state jurisdiction and concern.

The cost of transportation is a serious tax upon both producer and consumer. True statesmanship will endeavor to reduce this tax to the minimum by encouraging manufactories in agricultural regions, thus bringing the producer and consumer together as nearly as possible, and by this means not only reduce, but do away altogether in many instances with the cost of transportation. While charges for transportation by rail have been for years decreasing, and still continue to decrease, the cost of getting farm products to the railroad has not decreased.

Railroads have been multiplied and improved ; but the country roads, the only means of transportation between the farm and the railroad station, have remained as they were before the era of railroads. Improved facilities and sharper competition have been constantly reducing the cost of transportation by water and rail ; but the cost of getting our abundant agricultural products from the farm to the railroad has not decreased. More is expended to get a sack of flour from the warehouse in Boston or New York to the consumer, in either of those cities, than it costs to transport it from Minneapolis to the seaboard.

Great corporations are incorporated and organized, and millions of dollars expended for the purpose of constructing new railroads to reach undeveloped regions of the country. Railroads have been important factors in developing the resources and furnishing the means of transportation to all sections. The general government has aided their construction by large subsidies of money and grants of lands ; and states, counties, cities, towns, and communities generally, have made large donations for the same purpose. The government of the United States spends annually many millions to improve the water-ways of the country, in order that transportation, by water may be placed on such a footing as to enter into competition with railroad transportation, and by this accelerated and favored competition bring about a reduction of freight charges. It is proposed to expend many more millions in building up the American merchant marine, and thus to restore our carrying trade upon the high seas. One of the most important enterprises of this century is the proposed construction of the Nicaragua Canal, and wise statesmanship dictates a policy that will commit the United States Government to exert its power and expend its resources to secure the completion, at the actual and necessary cost of construction, of this great undertaking; and coupled with this substantial aid, should be the determination that when finished the canal shall be forever under the control of our government. And all this—the expenditure of millions—is to reduce the cost of transportation, and, by reducing it to benefit the producer and the consumer. It is time that attention was directed to the improvement of the farm roads of the country as a means of further reducing the cost of marketing farm products and benefiting the important class of our citizens engaged in agriculture.

Farmers are not the only class interested in farm roads: all classes have more or less interest in public highways. Some county roads, it is true, are seldom used except by the residents of the vicinity; but there are roads which, on account of their location, are used for general travel, and the property owners along such roads should not be required to bear the entire expense of keeping them in repair. Some of the principal highways of the state, therefore, might well be considered and treated as state roads and improved at state expense. Governor Hill, of New York, recommended the expenditure of ten millions by the state of New York for the improvement of the most important roads of that state; and a bill for that purpose twice passed the senate, but was defeated in the assembly on a close vote. The governors of other states have urged in their annual messages a system of improved highways.

There are two methods of securing better roads. One is to change the present indefensible system of collecting and expending the road tax in road construction and repair, so that the fund shall be economically and carefully expended, and also by the adoption of such legislation as will secure the proper location and the construction of good and durable roads, together with the preparation of careful, adequate plans and specifications before the work is undertaken; and the other is the raising, by incurring a bonded indebtedness, where state constitutions will permit of it, of a sufficient sum to construct at once a thorough system of improved roads in a county.

In Union and Essex counties, New Jersey, where a new system of macadamized roads has been recently adopted, and the roads constructed by funds borrowed upon bonds, the practical result has shown the policy to be most beneficial. The property of these counties "has appreciated in value far more than the cost of the roads;" and that not only in the case of sale and exchange, but upon tax levy. The actual increase of values of lands benefited by the improved roads, it is said, meets the increased taxes requisite to pay the interest upon the bonds issued for the improvement.

The construction at once of a complete and thorough system of county roads for a county, or several contiguous counties, has many advantages. It brings into the county, to be paid out for labor, and afterwards used in improving and increasing the value of the taxable property of the county, the amount requir-

ed for the improvement. As soon as the system is completed there is a large increase in the marketable and taxable value of all the farms in the county, and the people at once come into the enjoyment of the comforts and advantages which are derived from good roads. The work, the large amount of which makes it practicable to adopt a thorough system, can, therefore, be much more economically conducted than when it is carried on in a fitful and irregular manner, insuring at the same time the almost certainty of better roads. The annual tax now levied for the improvement of roads would be then levied to pay interest upon the bonds, and to keep the roads in repair. In some portions of the country it is, of course, more difficult and expensive to construct and maintain good roads than in others. In the valleys of the western portion of my own state, Oregon, for instance, owing to the alluvial soil and long continued rains of winter, the condition of the ordinary county roads becomes at times very bad ; but the problem of securing good roads there differs from the problem of making good roads in more favored regions, only as to the limit of cost.

Roads are often laid out in such a manner as to make their improvement difficult or impossible. The improvement when commenced is too frequently undertaken in ignorance of the character of the work required, with no definite plan, and without the supervision of those who have special training and experience qualifying them for the work, the result often being of such a character that the expenditure is nearly, if not wholly, a total loss. Therefore, it is safe to say that there is nothing in this country upon which so much money is expended, where there is such an exhibition of ignorance, lack of system and looseness in expenditure as there is in the repair of country roads.

I have an impression that if the taxes annually collected in this country were collected in money and judiciously and economically expended, in a comparatively few years the principal highways of the country would be put in a reasonably good condition. In most of the states the road tax is worked out ; and from time immemorial, the road work has been in many cases treated as a matter to be slighted. One man hired at so much per day will do as much, and probably more, work than several taxpayers working out their taxes. The whole system should be changed. The county courts, or other county au-

thorities charged with the administration of the road laws, should be required to determine in advance the character of the work, giving the matter such careful and intelligent consideration as would enable them to adopt a plan which would secure a good road suitable to the wants of the community, and adapted to the climate. As small a portion of the road-tax as is practicable should be used to keep existing roads in repair, and as large a portion as possible applied annually to the construction of a system of improved roads.

Legislation should be had by the several states looking to an improved system of public highways, providing as far as practical by general provisions requirements for the same. There should be in each county engineers charged with the laying out and preparing proper plans and specifications for the construction and improvement of highways. The road-tax should be collected in money, as other taxes, and should be set aside and kept distinct as a general fund to be expended under the direction of the county authorities. The labor employed should be hired at current rates of wages, and the laborer required to perform honest, faithful service. Greater care should be used in the location of roads. There should be some competent and skillful person in each county charged with the duty of seeing that the work is properly and economically done. Stone quarries, gravel beds, together with rock crushers, rollers, and other expensive tools and implements used in road construction, should be owned by the county.

When a railroad is to be constructed, numerous surveys are necessary to determine the best route, and the maximum of curves and grades is established, and upon the grade depends largely the value of the road, as the work that an engine can do is determined by what it can pull up the steepest grade. But county roads are located with little reference to grades, and when they are worked it is without intelligent plans. Steep grades, sand and dust in summer, and mud in winter, necessitate scant loads; delays and accidents necessitate the use of many more teams than would be required with good roads, and of course, largely increase the cost of transportation.

Some relief from the difficulties and expenses of travel and transportation off the railroad lines will, I hope, be furnished by electric car lines. Near the large cities in the west such lines are being constructed to remote suburbs, and are found not only

to be a great convenience but to be profitable. I expect to see them adopted as a means of communication between towns not connected by steam railroads in populous regions, and used for the transportation of both passengers and freight.

By whatever plan better roads are secured, the burden must fall upon the taxpayers, and their interest should stimulate the examination and the adoption of the best plans for road construction and improvement. The care and improvement of the roads are entrusted to the farming population, and upon them largely is the fault for the unsatisfactory condition of the roads; to them the negligent and slovenly manner in which the roads are worked, and the wasteful way in which the taxes are expended, are chargeable. This class of citizens, who are to be most benefited by good roads, need to be stirred up until a thorough reform is accomplished in the matter.

There is no dispute that improved roads are a necessity, and it would appear that that which is so desirable, and which every one must favor, can with proper effort be secured. The fact that the question of better roads is being everywhere discussed in this country, and the existence of a large and influential organization for the purpose of promoting improved roads, gives promise that the people are at last to be roused concerning the subject, and that something will be accomplished.



DIRT ROADS AND GRAVEL ROADS.

A PLAIN LETTER ON A PRACTICAL SUBJECT.

By Isaac B. Potter.

INTRODUCTION.



I SHALL aim in this letter to supply, by the use of familiar language, a few plain rules for the location, construction and care of country roads, according to methods which have been approved in theory and practice; and to point out certain errors and defects of treatment by which these roads are so often kept at their lowest point of efficiency. It may be that this style of treatise will not commend itself to the scientific reader, nor to the civil engineer, to whom elementary principles are already known; but every science begins with a fact, and in this country, where our road makers are a vast army of untutored laymen, I deem it better to teach those plain principles which lie at the bottom of scientific road making, rather than cater to the tastes of the learned few, who, in the matter of common roads, have little call to use the knowledge they already possess. And, after all, in writing to the farmer, the merchant and the every-day citizen, I shall be gratified to feel, that by recommending the observance of these primary rules, I am encouraging a closer and more sympathetic relationship between my special readers and the civil engineer, upon whose higher skill they must eventually depend, and upon the borders of whose field their steps will lead, even in the perusal of this simple treatise.



THE RESULT OF INTELLIGENT WORK IN KEEPING A DIRT ROAD. SIXTY BARRELS OF GARDEN TRUCK HAULED BY SINGLE TEAM ON DIRT ROAD AT CAPE CHARLES, VA.

From photograph by Mr. Orris A. Browne.

I.

To the American Taxpayer :

You have had my promise to write you a letter on the practical side of road making, and I am disposed to keep that promise as well as I can ; but now, when I find myself sitting down to the performance of what I thought might be an agreeable task, I confess to a feeling of hesitation and doubt. The practical side of road making, like all practical questions which concern the business of the public or the individual, involves a study of economy ; and this form of study is likely to include figures, computations, statistics—three ingredients, any one of which is more than enough to kill, in any written essay, those qualities which might otherwise have made it welcome to the ordinary reader.

But I want you to read this letter, slowly, and in small doses if you like; but still carefully, and with some thought of the things that I shall undertake to make clear. Remember that it is harder to write than to read and that after all my task is the greater, and having been undertaken for your benefit, you can ill afford to put it aside without a share of your attention.

Besides, our computations and statistics will not be intricate nor extended. We shall find it best to talk about our subject in practical, every-day language, and if you will leave me to state the facts of the case as they have been demonstrated in every department of trade where wagons are employed, and by all the scientists and scholars who have worked it out, I will stick as closely as possible to the descriptive side of the subject, and leave the treatment of the mathematical features to the enthusiast who works and writes for the rare and limited few who belong to his philosophical class.

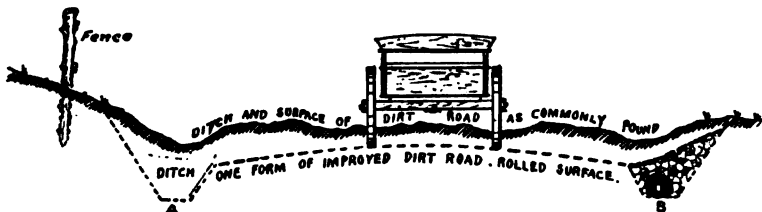
“Early and late with his pencil and slate,
He toils over angles and squares ;
What can't he evolve and what mysteries solve,
For which not another soul cares ?
With homologous lines and queer symbols and signs,
Hypothenuse, polygon, base ;
With some few trapezoids and as many rhomboids
He deals with a serious face.”

DIRT ROADS.

“Dirt,” says a learned Englishman, “is matter in the wrong place,” and to the man who is compelled to travel over the

American dirt road in spring and fall, it is easy to conclude that the Englishman must have evolved his definition while viewing an American dirt road. At any rate, it is because the definition is so appropriate that I have chosen to term these roads "dirt roads" rather than earth roads, as they are often called by scientific writers ; for, notwithstanding our almost exclusive use of this kind of highway in our country districts, it stands lowest in the scale of excellence, economy and durability, and highest in cost of thorough repair, of all the land highways adopted for public use.

"Dirt" is a very comprehensive term, and in speaking of dirt roads I include all those roads which are made from the natural soil found in the line of the roadway, including clay, sand, loam, gravelly earth, and, what is very common, a mixture of two or more of these in whatever proportions. And I write you at length about dirt roads because, although dirt is rarely adapted to the making of a good wagon road, and never quite adapted to the making of the best and most permanent ones, there is nevertheless a vast difference between the right and wrong methods of making and keeping even a dirt road, and upon your knowledge and practice of these methods will depend the efficiency of your dirt road, the cheapness with which loads are hauled over it, the number of break-downs which occur in the year, and the size of the loads which your horses will be able to haul.



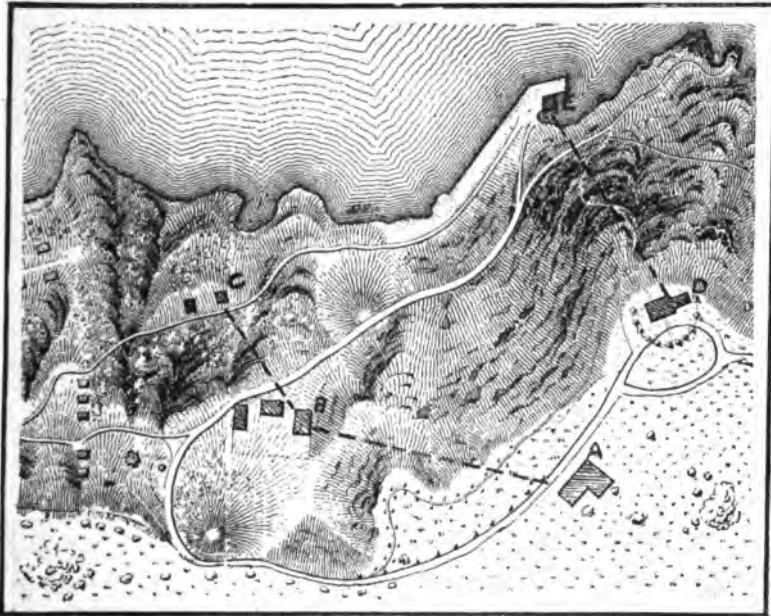
CROSS SECTION OF DIRT ROAD SHOWING COMMON FORM OF BADLY SHAPED SURFACE, TENDING TO BAD DRAINAGE AND PERMITTING WAGON WHEELS TO SINK IN SOFT SURFACE.

If you look at this figure you will see that I have drawn a cross section of the rough dirt road surface as commonly seen in many country districts, and this surface is shown in the drawing by the irregular shaded line. This cross section is roughened and made irregular as I have shown it, through a variety of causes. In the first place the dirt is commonly thrown up from the shallow side ditches, and left lying loosely in the middle of

the road, where it is so placed as to imperfectly fill the ruts and mud holes, and the first passing vehicle compresses this soft earth in two shallow gutters corresponding with the direction taken by the wagon wheels on either side. The first rain storm causes the water to collect in quantities in these two depressions, and the continuous passing of vehicles causes a further depression in the material now softened by the water, until, in a very wet season, the wagon sinks several inches into the mud and hauling becomes correspondingly difficult. Under these conditions the shallow side ditches are of no value, and unless the soil is very porous and of a kind to insure quick drainage, even the deepest and most capacious ditches would be of little use. You have often noticed in clay roadways, how the water stands for days at a time in deep ruts, when nothing intercepts its flow into the side ditches except a narrow ridge of clay which forms the side of the roadway. The clay forms an absolute barrier which prevents the passage of this water, and in such situations, unless the clay surface of the roadway can be kept properly sloped and hard rolled at all times, side ditches are in no sense sufficient to insure the proper drainage of the road. And right here, in regard to rolling, it may be beyond your power to purchase a heavy roller such as should be used to consolidate all roads, and in that case your road can only become hard by the rolling process which goes on when the wheels of passing traffic are rolled over it. It needs no argument to assure you that the manner in which this rolling by wagon wheels is accomplished, will depend not only upon the weight of the loads hauled over the surface but very much upon the width of the wheel tires on which the loads are drawn. On this point of narrow wheel tires our Yankee fancy has led us to a ridiculous extreme. The next time your wife is making bread you had better pay a visit to the kitchen, and if you find her trying to roll dough with the edge of a buzz saw, you may make up your mind that she is doing her work with about the same speed and with quite as much sense as you exercise when you try to haul three tons to market over a wet clay road on narrow wheel tires. I have now digressed rather more than is sufficient to show you my reason for taking up the subject of dirt roads, and we can now go back to the regular line of our treatise.

Location.—If you are disposed to question the value of a plain treatise on the method of laying out or locating a country road, I

beg to assure you that in no branch of road making is knowledge so generally needed and ignorance so universally shown as in laying out the original line ; and that none of the institutions in the domain of common property imposes one-tenth as great an expenditure of unnecessary labor and money as that imposed upon the public by the ignorant and incompetent methods employed in the laying out of our country roads. It is true that the most important of these roads have been located for many years, and what may be said under this head will have no direct bearing upon the question of their immediate improvement ; but it is also



MAP SHOWING LOCATION OF ROAD IN ROUGH COUNTRY. THE LINE IS LENGTHENED AND MADE TO DESCEND THE SLOPES GRADUALLY SO AS TO AVOID STEEP GRADES.

true that the opening of new districts makes it every day necessary to lay out new roads, while many of the older and more important ones might well be abandoned in favor of shorter and better routes with easier grades. You will also bear in mind that what I write here regarding the location of a dirt road applies with equal force to the location of all kinds of land highway, and that location being the first thing to be determined, and generally the most lasting and unchangeable feature of the road it-

self, cannot be too carefully provided for ; nor can I see how it is possible for time and zeal to be thrown away in this branch of the work. It is a great field where costly errors and permanent blunders may creep in and fasten themselves as everlasting taxes upon the road and its hundreds of users, and, worst of all, these errors become more costly as the use of the road increases and its value as a public highway becomes better established.

These considerations have led me to write you briefly on the subject of location.

The two terminal points of the proposed new road must first be considered. If you can procure a county map, or other map showing on as large a scale as possible, the points decided upon as the two ends of the proposed new road, as well as the general contour of the intervening country—the streams (for these will indicate the direction of the valleys), the hills, mountains and prominent natural features of the country, your work will be made more easy. You should now ascertain the difference in elevation between the two ends of your proposed road. If you are familiar with the use of the ordinary engineer's level (easily learned, and the instrument much less complicated than is generally supposed), you may run "a line of levels" over the approximate route selected for your new road, making note of the elevation of different important points as you progress, and taking care to walk over the route in both directions, remembering that nothing is more likely to deceive you than the apparent difference in level, the rate of slope, etc., presented by land surfaces with which you are not fully familiar. This will be more apparent to you as you travel the route in both directions, for you will soon see that the land which appeared to be fairly level when viewed in one direction, presents a very marked declivity when approached from the opposite way. In the absence of a level, and indeed in any case, the Aneroid barometer may be used to advantage to get approximate differences of elevation throughout the line of the proposed road, but if neither of these instruments is at hand, or if you are unable to make use of an instrument, it will be found best and cheapest to engage the services of a competent surveyor.

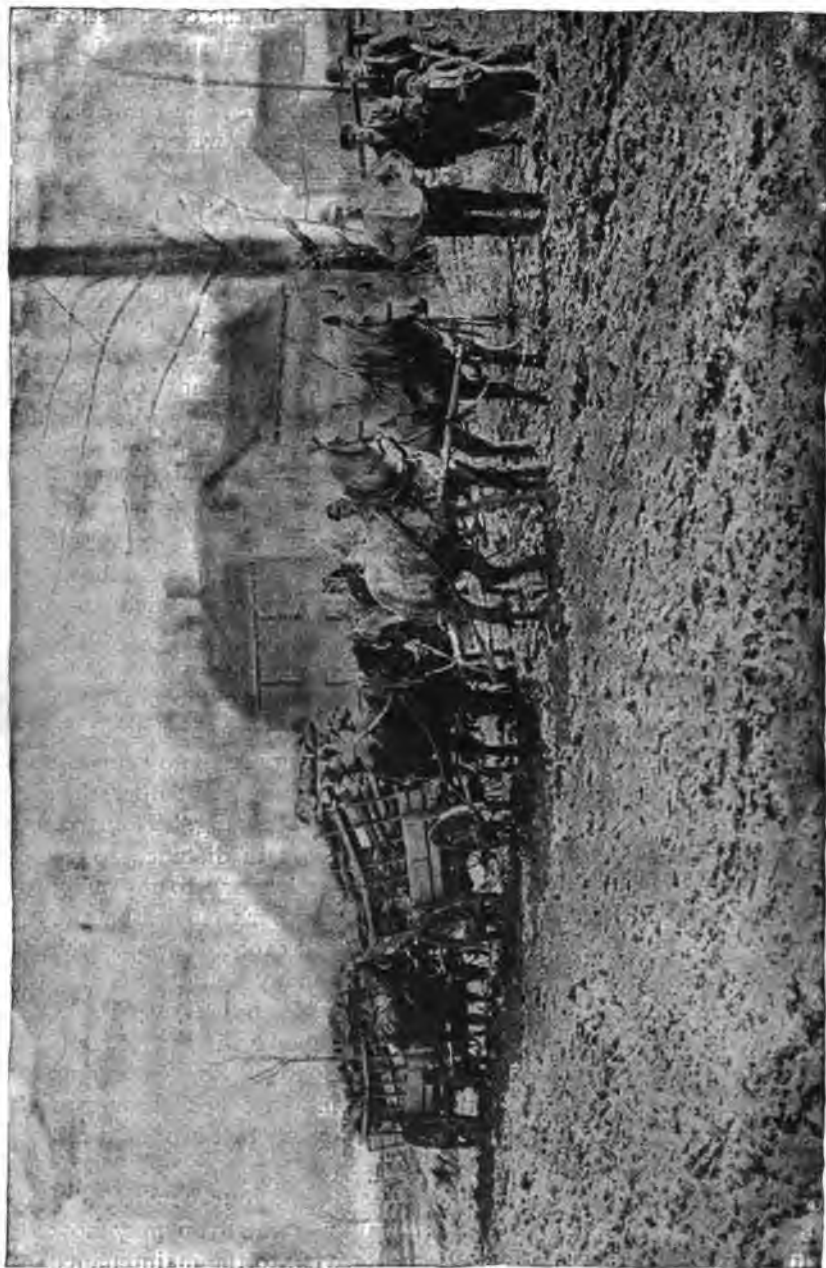
In cases where the terminal points of the new road are at, or conveniently near to different lines of railroad, or at two different points on the same railroad, the difference in elevation between the two ends of the road can be learned by inquiry at the

engineer's office of the railroad company, for in the construction of every railroad, the elevations of both the natural surface of the ground and the grade adopted for the road-bed, are determined and recorded before the construction work begins, and these elevations very frequently refer to the height of tide water.

II.

Assuming now that you have found the difference in elevation between the two ends of your proposed road, let me impress upon you the importance of one thing. In locating your line of roadway, try not to let it rise, at any place, above the higher terminal point of your road. In other words, remember that every violation of this rule will simply require every traveler who goes over the road to travel a certain distance up hill with the inevitable prospect of traveling the same distance down hill, and that this extra exertion is a constant tax upon all the traffic which shall be carried over the road for all time. It may not always be possible to adhere strictly to this rule, because a ridge of hills or mountains may intervene between the two places which your new road will connect, and the crossing of this ridge may compel you to rise above the level of your higher terminal point. But if met by such an obstacle, you will naturally seek to cross the ridge at its lowest point and thus make your grade as light as possible. In all things bear in mind that you are to go round a hill rather than over it ; or to use an old saying, remember that "the handle of a pot is no longer lying than standing." Then too, aside from the fact that it may be as short in distance to go around a hill as to go over it, you can well afford to go many times this distance to avoid steep grades, rather than lessen the value of your road ; for you know that every foot added to the steepness of your grade will decrease by many pounds the size of the load which your best team will be able to haul over it. It will be a convenient rule for you to remember, if I say that it will generally be better to add twenty feet to the length of your road rather than one foot to its elevation. In other words, you had better run your line of road two thousand feet around a hill one hundred feet high than to go over it.

If you find that you can locate the line of your new road so as not to rise above either of the terminal points, you may now direct your attention to another matter, viz.: to the maintenance



THE RESULT OF BAD GRADING AND POOR DRAINAGE. TEAMS STUCK IN THE MUD NEAR CLEVELAND, OHIO. (FROM A PHOTOGRAPH.)

as nearly as possible, of a uniform grade between the two terminal points of your line. In practice this can be rarely, if ever, attained; but as a rule the nearer you approach to this uniform rate of grade the more satisfactory will your work become, and you will be enabled to avoid the most common and costly blunders which have marked the location of hundreds of important country roads within the United States.

The hints which I have already laid down will suggest to you the advisability of following the lower lines of valleys wherever this can be conveniently done. In running your road through the length of a valley, you will generally find it best to avoid the steepest side and adopt that course which presents the fewest obstacles to cheap construction. If a stream runs through the valley, examine the flood marks and other indications which determine the highest point to which the stream has risen in times of freshet, and keep the grade line of your roadway well above this point. If the two sides of the valley are otherwise equally favorable to the location of the road, choose that side upon which you are able to find convenient gravel beds, and other material of gritty, hard and durable nature, which may be used in the future repair and maintenance of the road. Besides these considerations you must have in mind the location of adjacent roads, the probable building of branch and connecting roads in the future, the fertility of surrounding lands, and the condition and convenience of persons living along the line and by whom the road is likely to be used, and other features, all of which will call for the exercise of your discretion and impress you with the fact that, after all, the proper laying out and locating of a road is a matter with which every tyro cannot be safely entrusted.

After locating and laying out the centre line of your road, by means of the usual line of stakes used for that purpose, you will next be required to fix the grade line throughout the entire length. This grade will be governed very largely by the manner in which the centre line has been located, and you will now be more than ever impressed with the importance of good location. As time goes along and the traffic increases over your new road, the demands of the public will require that its surface be made harder and kept in better condition, and with this in view you must remember that the smoother and harder the road is made, the more objectionable will steep grades become. I have promised to avoid mathematics as far as possible in this letter, and so

I will not attempt to include any computation by which the ruinous effects of steep grades is determined, for, aside from the rule followed by mathematicians, it has been found by actual experiment, over and over again, that, if a horse can haul over a level road, a load of, say, one ton, the same horse will be able to haul about only 1,600 pounds on a rising grade of one foot in fifty, and as the grade becomes steeper, the hauling power of the horse rapidly lessens, until, on an up grade of one foot in ten, the same horse would be able to draw only about 500 pounds, or one quarter the load which he might be able to haul on a level. Let me print here a short table showing about the rate of decrease of hauling power of horses, with the increase of grade. Assume that a horse can draw one net ton of 2,000 pounds on a level road. Then in going up hill he will be able to haul as follows :

On a rise of one foot in 100,	the horse can draw only 1,800 pounds.
On a rise of one foot in 50,	" " " " " 1,620 "
On a rise of one foot in 40,	" " " " " 1,440 "
On a rise of one foot in 30,	" " " " " 1,200 "
On a rise of one foot in 26,	" " " " " 1,080 "
On a rise of one foot in 20,	" " " " " 800 "
On a rise of one foot in 10,	" " " " " 500 "

These figures will not be found to be strictly accurate on all kinds of roads, but they are reasonably so in nearly every case, and will be sufficiently close to the real facts to guide you in determining the importance of moderate grades and a careful location of your road.

On page 127 I have placed a map or plan showing the careful location of a road in a hilly country; and an examination of this map will show you how this important principle of good location has been observed, and how the distance between the terminal points of this road has been largely increased in order that the grade might be made gradual and travel made easy. Toward the bottom of the map you will see a portion of a cultivated plateau or field, situated on high ground, from which slopes descend on all sides, to rough, intervening hills and mountains, and finally to the sea shore in the distance. Between the buildings A, B and C, the shortest distance is indicated by the broken lines, and in a similar manner the distance between D and E would be in the direction of the broken line marked at its two ends by those two letters. It is clear, however, that to pass

directly from A to B, from B to C, or from D to E, would involve traveling over a rough country and down very steep slopes; so that, to say nothing of the difficulties of construction, while traveling in one direction might be made rapid and easy, the steepness of the grade in the opposite direction would render the hauling of loads a matter of the gravest difficulty. Having in mind these facts, you may notice how, by increasing the distance and following the gradual slope supplied on the route of the winding roadway, an easy grade has been attained, and sudden declivities in the grade of the road avoided.

When it becomes necessary to carry the line of your road from a lower level to a higher, make your slopes as long and gradual as possible, even at the expense of increasing distance, for if you make the rise abruptly and without due reference to the steepness of the grade, you will find in the end that this portion of your completed road presents an obstacle which limits the maximum load which can be hauled from the lower to the higher level, in a most unexpected way; and it may even be found necessary to hinder and interrupt traffic by lightening the grade after the road is completed.

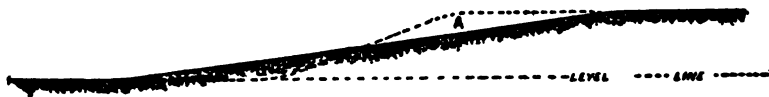


FIGURE SHOWING MANNER OF REDUCING GRADE OF STEEP HILL IN LINE OF ROADWAY BY CUTTING OFF AT TOP AND FILLING IN AT BOTTOM.

This is sometimes done, as shown in the figure, where the original grade of the road is shown by the dotted line and the new and improved grade by the full shaded line, the changed form of road having been accomplished by cutting off a portion at A, and filling in the foot of the slope at B. A little reflection will convince you that it is much cheaper and wiser to secure this lighter grade at the time of first constructing the road, than after it has been open to public travel.

I have mentioned the use of the Aneroid barometer in connection with the work of locating a road, and have recommended it. If you have no knowledge of the convenience of this little instrument, you are likely to be appalled by the suggestion, and to regard the Aneroid barometer as an intricate, complicated and difficult instrument to use. Let me assure you that in this you are mistaken. The most formidable thing about the Aneroid barometer is its name. The instrument itself is as simple as your

butcher's spring balance and less complicated than your kitchen clock. The clock has two movable hands, and the barometer has but one. The barometer needs no winding up, and its use is simply to register the weight (that is the pressure) of the atmosphere, just as the ordinary spring balance indicates the weight of sugar and tea at the grocer's. If you take twenty boxes, each one foot square on all sides, and stand them on a level surface, placing one box exactly upon another till all the boxes form a straight column twenty feet high, the bottom box will press against the floor with a pressure representing the weight of all the boxes combined. In other words, if each box weighs one hundred pounds, the entire weight will be one net ton or two thousand pounds, or one hundred pounds for each foot in height. Now if you wish to ascertain the height of the top of any box above the ground, without actually measuring the distance, you could easily do so by weighing the number of boxes above it; and if you found that these boxes weighed, say five hundred pounds, you would know that there were five boxes included in this weight, and that the boxes below, weighing fifteen hundred pounds, would be fifteen in number, and exactly fifteen feet in aggregate height. In this manner any height in the column of boxes could be ascertained by simply weighing the boxes above.

In very much the same way are heights determined or measured by the Aneroid barometer. You know that air has weight, and that the air at the surface of the earth is heavier and more dense than the air above, just as water exerts a greater pressure at the bottom of the sea than at the surface. When the aeronaut ascends in a balloon, his barometer indicates the weight of air as he goes up, and by this means he computes the height of the balloon above the earth's surface, and persons exploring new countries find the height of hills and mountains in the same way; and so the Aneroid barometer is not only very useful, but indispensable in many kinds of work in an extended survey. It will save many times its cost in shortening time, to say nothing of its practical use in determining the best location of the road. To use it you need only have a knowledge of the four foundation rules of arithmetic. In making use of the Aneroid barometer you note the "reading" shown by the index hand or needle at each of the two points between which you wish to find the difference in elevation. Add these two readings together and call this result the "sum." Then subtract the smaller reading from the larger and

call this result the "difference." Then multiply the difference by 55,000, and divide product by the sum. The result will give you the difference in height between the two stations in feet. To state it in another way; the sum of the readings at the two stations is to their difference, as 55,000 (twice the height of the atmosphere in feet) is to the elevation required.

I have tried to urge strongly upon you the importance of a careful location of your road, and that the "alignment" be so fixed and laid down as to avoid steep grades and insure an easy and gradual rise from the lower terminal point to the higher one.



SCENE SHOWING BADLY DRAINED DIRT ROAD. THE EVILS OF NEGLECT AND NARROW WHEEL TIRES. (FROM PHOTOGRAPH.)

Remember that the location which you are now determining is likely to serve for many generations, and perhaps for all time, and that the growing importance of the surrounding country, the erection of new buildings and the laying out of permanent division lines between different property owners will make a future change of location of the road a difficult matter to attempt, if not an improbable one to carry out. Remember, also, that while a steep grade may assist you in traveling in one direction, there

is a law of compensation—an exacting rule of give and take—which operates on the farmer's roadway as in every other line of work where we go lazily through half our task, and pay the penalty by doubling the fatigue and effort on the other half. In the use of the dirt road remember that the road has two ends, and that over this road the people are traveling in both directions; that the ease of passage which is induced in one direction by the falling grade, is more than balanced in the opposite direction by the extra power required in hauling traffic up hill; that this extra power cannot always be amply provided for on steep grades, and consequently every load hauled up these grades must be reduced in weight so as to come within the drawing capacity of the horses employed. With the increase of grade this drawing capacity lessens very rapidly as I have already shown you by the brief table on page 132.

Thus far I have tried mainly to impress upon you the importance of securing light grades in laying out your road, and have advised you to go many times around a hill rather than go over it once, because steep hills are, after all, the worse features in the line of any road, and especially so because they form a permanent obstacle in the way of hauling heavy loads, and whatever else may be done to improve the road, steep grades cannot be overcome except at great cost and much labor. But, where the lengthening and curving of the road are not made necessary as a means of avoiding steep grades, it is well to understand that a direct line between the terminal points should be followed as closely as possible, and even when curves are adopted for any reason it is best, if possible, to make them long and gradual rather than sharp and sudden, especially in a new country, where long timber is likely to be hauled over the road, and it becomes desirable for any reason that a considerable length of road should be seen by the traveler at all points of the curve. It is also urged in behalf of curved lines that a continuous straight road becomes tiresome and unattractive, and that a slight curving may be given to the line even in a level country, without materially increasing the length of the road. It is said by an American authority that if a road between two places ten miles apart is made to curve so that the eye can nowhere see more than a quarter of a mile of the road at once, its length will exceed that of a perfectly straight road between the same points by only about one hundred and fifty yards. This consideration, however, is one which runs contrary

to the strict rule of economy and calls for the exercise of individual fancy rather than the application of technical rules.

Having now determined the approximate location of your road by the rules which I have suggested in a general way, it will be necessary for this location to be more accurately fixed, and this should be done by the use of a surveyor's compass or, in important cases, by the more accurate engineer's transit, and the location thus finally determined should be accurately marked out on the ground by lines of stakes at proper intervals, remembering that fewer stakes will be necessary for those portions of the road which are laid in straight lines, and that the stakes will need be driven closer together where the curves are shorter and the ground uneven. You will remember, also, that the compass or transit will be needed in determining the property lines of the different owners whose lands your road will cross, for these owners will have to be provided for in fixing compensation for the public easement of the road, and the amount of this compensation will depend in no small degree on the quality of the land, its location and the amount appropriated for the use of the road. It will therefore be necessary in most cases to prepare a map showing the line of the road and the lands of the intersected farms, names of owners, width of roadway at different points, locations of streams, etc., and after this, especially if your work is to be done by contract and in every case where the encountering of a rough country requires skillful treatment, the "profile" of the line of the road, showing the original surface and the grades adopted for your roadway, will need to be prepared for preliminary estimates of the amount of work to be done. "Cross sections" should also be taken and laid out, showing the amount of excavation and embankment, the proportions of rock and earth to be handled at different points, and the probable cost of culverts and other structures if needed, and other details which belong peculiarly to the work of the engineer. This work will require the use of the engineer's level, for your barometer is not of sufficient accuracy to serve you in this work, nor could it be used rapidly enough to determine the many hundreds of elevations which construction work will require.

From what I have now written (and I have tried to express it as simply as possible), it will not be hard for you to conclude that, after all, it will in most cases be vastly cheaper and infinitely better to employ a skilled engineer from the beginning of your

location to the end of your construction work. He will save you in the end many times the cost of his services and you will have the satisfaction of knowing that your work when completed is better designed to answer the purposes of a good wagon road than though it had been left in the hands of a tyro, as too often done in the location of our country roads. "I do not know," says Dr. Lardner, "that I could suggest any one problem to be proposed to an engineer, which would require a greater exertion of scientific skill and practical knowledge, than laying out a road," and if this is true, how much more is it apparent not only that an engineer should be employed in the laying out of a country road, but that he should be selected with special view to his ability and experience.

(*To be continued.*)

FRENCH ROADS OF THE CENTURY.

By Francis B. Loomis, U. S. Commercial Agent at St. Etienne.



HE modern road system of France was inaugurated by the First Napoleon and carried forward to its satisfactory and splendid conclusion by the late Emperor, Napoleon the Third.

The roads of France are now practically all built, and they are substantial monuments to the Napoleonic foresight and shrewdness. The work of the engineers in the department of public works in France to-day is not to build new roads, except in rare instances, but to keep those already constructed in a state of high efficiency. There have been no important new roads opened in France for a dozen years, and the country is so traversed with excellent roadways that no more lines of communication are likely to be exploited save in the case of military necessity. The wagon roads of France, always passable and reaching all centres of population, no matter how small, are the chief competitors of the railways, as means of communication by water are not numerous.

Value of French Roads.—The road system of France has been of far greater value to the country as a means of raising the value of lands and of putting the small peasant proprietors in easy com-

munication, with their markets, than have the railways. It is the opinion of well-informed Frenchmen who have made a practical study of economic problems, that the superb roads of France have been one of the most steady and potent contributions to the material development and marvelous financial elasticity of the country. The far-reaching and splendidly maintained road system has distinctly favored the success of the small landed proprietors, and in their prosperity, and the ensuing distribution of wealth, lies the key to the secret of the wonderful financial vitality and solid prosperity of the French nation.

Typical Roads.—The French roads have compelled the respect and admiration of foreigners for a century, and of all the roads in the country those considered the most excellent, and at the same time most difficult of maintenance, happen to lie in this consular district, which contains in the Isère some of the most rugged of the French Alps, with their peaks forever snow clad and rising to a height of 11,000 feet.

Another department, that of the Loire, is a great industrial centre, and its roads are subjected to the wear and weight of vehicles heavily laden with iron, coal, castings, and blocks of stone. It is also a partially mountainous region.

The French road engineers consider the roads in these two departments, the Loire and the Isère, as examples of the highest type of perfection to which modern road-making has reached in this country.

The roads in these departments are numerous, of easy grade, solidly built, always open and always good, save when temporarily blocked with snow. They are subjected to the most changeable and violent forces of nature. Snow, frost, ice, and furious glacial torrents springing suddenly into existence at unexpected points have sought for a decade to destroy them, but in vain.

In the high, mountainous regions of the Isère I have seen, after violent summer rain of thirty-six hours' duration, fifty yards of national road, including a small bridge, washed away by a fearful torrent rushing down from a cloud-capped field of ice, with an almost vertical fall of 2,000 feet. In three hours, and in the midst of a severe storm, I have seen that same road repaired temporarily and made passable by the road men in this remote and little frequented region.

It is this never failing watchfulness and promptness in repairing roads, coupled with thorough and honest construction,

which gives France a system of roads which is at once a source of national strength and national pride.

From the road records of the departments of the Loire and the Isère, from recent observations and from the practical communications of the working engineers, I have condensed some information covering the principal points in the methods now employed in building and preserving French roads.

Divisions and Classification in France.—In France the ways of communication are divided into three classes, as follows : First, national or state roads, constructed and maintained by the state ; second, department roads, entirely at the charge of the departments ; and, third, township roads which, though constructed by the communes, receive in most cases support either from the state or from the departments for their maintenance.

The national roads radiating from Paris communicate with all the important cities and the departments in the country. They are placed under the jurisdiction of the *ponts et chaussées* (department of bridges and roads), which is attached to the bureau of the minister of public works. The second and third class of roads form a network over the country and are under the supervision, in a general way, of the prefects and mayors. However, in most departments these roads, too, are also intrusted to the care of the *ponts de chaussées*.

Further, there exists in towns of a certain importance a municipal road service, the business of which is to construct and maintain streets and roads within the limits of the city.

Legal Preliminaries.—For the construction of a road two principal operations are required, viz.: First, the formation of the bed of the road as well as the construction of the water ways and bridges when necessary ; second, the making of the road with paving stones, or by the method of Macadam, in order to render it fit for traffic. When the need for a new road is felt in a given district, an estimate, with designs, is drawn up and forwarded to headquarters, together with evidence justifying the demand. When this formality has been gone through, civil engineers go over the region, examine the direction the road is to take, draw up an exact estimate of the cost, make the specifications, and write out in detail for the benefit of the contractors their observations on the manner in which the road should be constructed.

The report of the engineers is sent to the proper authorities.

Before commencing the work the authorities proceed to acquire the necessary lands through which the road is to run, and the proprietors are invited to sell the rights of way.

If a landowner demands a much higher price than the estimated value, the Government appoints a special jury to appraise the land, and it is condemned on their valuation, from which there is no appeal. This act is called in France "*Acte d'expropriation*," or dispossession.

The work is then placed in the hands of the contractors, who must execute it under the supervision of the engineers and according to the stipulations of the estimate, and if any difference arises between the contractors and the engineers it is brought before the conseil de prefecture, from the decision of which body, however, an appeal can be made to the state council.

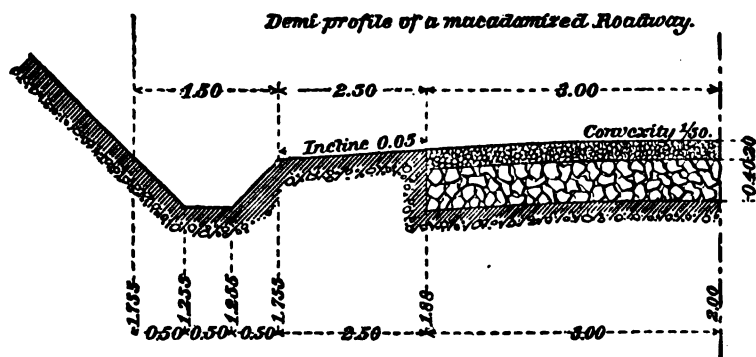
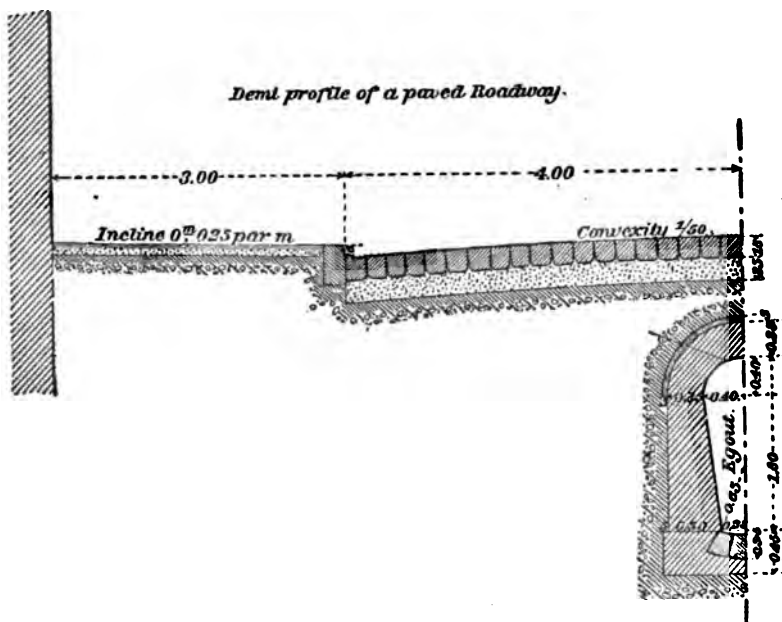
Running the Line.—It is not necessary to go into the political, commercial, or industrial considerations which induce the Government or local administration to decide upon the creation of a road. It will be sufficient to imagine two given points which it is desired to unite by means of a new road and to mark out within these limits the best line, bearing in mind three cardinal points—economy in the working expenses, security for the traffic, and the cost of repairs, which should be reduced to the lowest degree.

To trace a road a topographical chart is first studied in order to obtain the exact positions of the extreme points and their relation to the neighboring or intermediary points. The ground is then gone over in order to complete the information furnished by the chart and to discover other points if necessary which would be preferable in a technical or commercial point of view. These might be bridges, which could be used with advantage and thus realizing a certain saving, or in the case of a stream where the construction of a bridge presented more facilities than at the points originally indicated, or, again, certain depressions in the ground which would permit the road to pass over a hill with a lower gradient, or, lastly, where populous centres require that the proposed road should run through them.

A careful and well considered examination having been made on the main points of the line, sections of more or less length are studied so as to unite them all, finally, with more facility.

It is impossible to lay down a general and absolute rule, to obtain the best tracing between any two points. The nature of

the ground and the intelligence and liability of the operator have a certain bearing on the end in view. However, a good method of avoiding grave errors and much trouble would be, trace at first upon the plan of the region between the two points a



Scale 1/50 of a metre.

straight line uniting them; this line forms the tracing of a vertical plan in which the axis of the projected road is placed.

The next thing is to consider, first, if it would be possible to make on this plan either a uniform incline or a series of inclines,

not exceeding the degree of inclination previously fixed and at an average cost ; second, if this plan did not encounter material obstacles, such as swamps, mountains, or buildings, which could not be overcome without considerable expense ; third, if by going to the right or left of the line it would not be possible to obtain a more gentle incline or a decrease in the expenses of the construction or both together.

It is only in very rare and exceptional cases that a road can be advantageously traced in a direct line between the two points, even when they would be separated by a short distance. It is generally necessary to deviate in order to avoid difficulties to give the road the best position to escape heavy fillings or cuts.

Early Details.—It is especially to mountainous districts that the foregoing considerations apply in deciding on the tracing of the road. The difficulties to be met with in those regions can hardly be explained in this report. It will suffice to say that the intelligence of the engineer reduces those difficulties as much as possible. The lowest points of the ridges are chosen, and when possible the lines of the valleys are followed.

In general, where the points intended to be united by a road are situated upon flat ground, the natural indication is the straight line, but more frequently the ground is intersected by marshes, streams, or buildings, and in that case the tracing must be modified to suit economical considerations, convenience and solidity.

Where the ground is not very uneven the tracing can be made without much difficulty, but it would be well here to remark that a curved tracing lengthens but slightly a road and should be preferred to a zigzag line.

The Engineers' Work.—When the termini are separated by sinuosities the grades of which are greater than those previously fixed, by valleys, ridges, or mountains, the direction of the tracing is difficult to determine. A simple bird's-eye view is not sufficient; the difficulties increase with the degree of the roughness of the country. If the road has to cross a chain of mountains, the lowest point must be determined at the outset in order to diminish as much as possible the expenses of the cuttings. To effect this object the following points will be found useful as hints in order to avoid long and tedious leveling.

Practical Hints —1. The ridge of a chain of mountains, without having anything geometrical about it, either in the horizontal

or vertical sense, is, however, looking at it in the *ensemble*, nearly straight. It inclines always in the same sense as the valleys.

2. When a ridge meets at the same point two or more secondary ridges this point should be raised to the maximum level.

3. When a ridge meets two thalwegs (or valleys) situated on either side, the point of meeting should be a relative minimum.

4. When a ridge is met by a secondary ridge and a thalweg, it presents a horizontal inflexion at the point of encounter without presenting anything particular in the vertical sense.

5. When two thalwegs after having been parallel diverge in opposite directions, the point where they meet the ridge is necessarily a minimum.

6. When two thalwegs observe paralleled courses for a certain extent, but running in opposite directions, the ridge ought to present a minimum point in the interval which separates the two thalwegs. If the points chosen are situated in the same valley, the water courses must be taken into consideration.

The question of choosing the site of bridges is very important ; so important, that if the river to be crossed is considerable the direction of the road must be rendered subordinate to the site of the bridges. If there exists several practical points of passage, they must be compared carefully in order to select the one most suitable and conforming to the following conditions : Good nature of the ground for a firm foundation, normal direction of the current, stability of the bed of the river, and concentration of the waters in the same bed. If one terminus be situated in a valley and the other on the slope of a hill, the solution will depend in a great part on the average slope of the ground between the terminal points. If this slope conforms in general to that already fixed the tracing is made in a straight line.

The Old Way.—In short, if the average incline is inferior to the limit fixed several solutions are possible.

The straight line might be taken, but this tracing is not much observed to-day, for it happens more frequently that the points to be joined are separated by secondary valleys which would have to be crossed with a great deal of difficulty and inconvenience. Many of the old roads were constructed on this system. They were projected over mountains and valleys regardless of the natural obstacles of the route or the interest of the population, and as they were pushed on boldly, they were constructed at the expense of enormous trouble and never were

they satisfactory. The aim supposed to be in view, the shortening of the distance, was far from being attained, as the delays arising from the up-and-down-hill nature of the road lengthened in reality the distance much more than the curves of a level road.

Another system consists in following in a horizontal line as much as possible the ridge in its length, and descending to the second point by a gradual incline. This method was much employed formerly, and had the advantage of crossing the streams almost at their source, necessitating consequently but comparatively unimportant outlays for the crossing. But ridges which are generally sinuous require a very undulating tracing, and being but sparsely inhabited, the road loses much of its importance.

A third solution, and the one generally employed to-day, consists in following the valleys as much as possible, and rising afterwards by gentle grades. This tracing traverses the cultivated lands, regions studded with farm-houses and factories. The value of such a line of communication is much more considerable than that of a route by the ridges. The water courses which flow down to the principal thalwegs are, it is true, crossed where they are largest, and require works of large dimensions, but also they are fewer in number.

Mountain Roads.—The terminal points may be situated on the slopes rising from the same valley, and then the shortest route would be to go down directly from one side, cross over, and ascend the other. This direction, however, is often impossible on account of the inclines being too great on either side, and would necessitate the filling up of the valley, causing thus great trouble and expense. It is much preferable to run along the side of the hill, observing a gradient and to go up on the other side in a similar manner. The valley can be crossed then without requiring a heavy embankment. But of course the length of the road is thereby much increased as well the expense of the construction.

Whenever it is necessary to unite two given points situated in different valleys separated by several small ridges the difficulties are very great, and increase with the importance of the uneven nature of the ground. The points of passage over the ridges are first determined, always bearing in mind the probable cost, which should be as low as possible. When they are fixed upon, the outline is subdivided into different lengths and examined apart. It can be easily inferred then that the chief difficulty lies in choosing these

points of passage over the ridges. Moreover, before fixing on the points of passage, it is necessary to be assured that they can be reached, for sometimes this is impossible as the hillsides are too steep.

Construction of the Road.—When the outline of the road is fixed upon, the profile of the length is exactly marked out as well as that of breadth, so as to evaluate the earthworks and the works of art. The transverse profile of a road affects generally the following form :

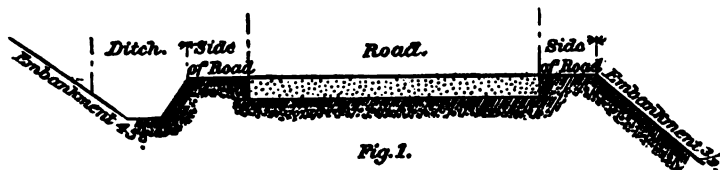


Fig. 1.

It is composed of, first, a roadway varying according to the importance of the road from 3 to $6\frac{1}{2}$ yards in width, and even more in some cases, where the circulation requires it ; second, the sides are also of variable width, and the ditch destined to receive the water coming from springs or rain. Sometimes a part of the sides is higher than the roadway (Fig. 2), and in that

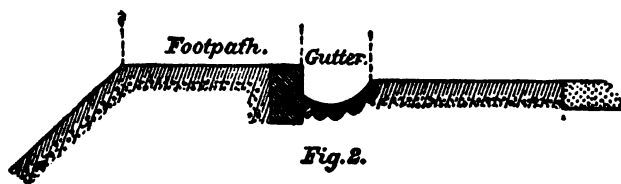


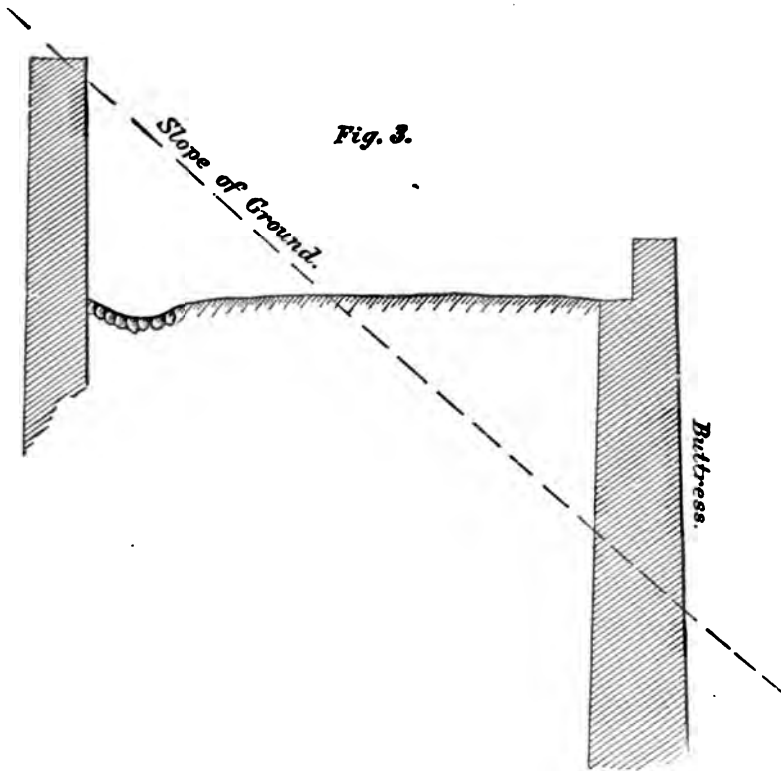
Fig. 2.

case it takes the name of footpath, and is generally seen in towns, or in their neighborhood, to facilitate the circulation of the foot passengers. But in such instances it is necessary to establish a gutter to receive the waters of the street. The roadway is barrel shaped, and the sides are sloped transversely in the proportion of one inch to the metre, to facilitate draining, the width of the ditches or gutters being in proportion to the amount of water to be received. The slopes or embankments are pitched at an angle of 45 degrees in the case of excavation. In mountainous regions a rectilinear profile is given to the road, which is inclined towards the side of the mountain especially in the curves, the convexity being on the side of the valley. A wall confines the road on the side of the precipice, and a ditch runs along by the

hill. In the case of large cuttings, the sides of the road are sometimes suppressed in order to diminish the cube of excavation.

It is not, however, always possible to construct a road on the above plan, for it often happens that the sloping of the ground is such that it would require a very large and steep embankment to cross the ravines.

In such cases the embankment is replaced by sustaining walls on either side, as shown in Fig. 3.



The foundation must be well laid, and the thickness sufficient to resist the weight of the soil. These walls are built wherever they cost less than the embanking process, and when the security of the traffic requires it.

The construction of a road brings often to light springs which appear at first sight harmless, but little by little they sat-

urate the soil and end by washing it away. In such cases drainage must be rigorously applied so as to prevent inevitable consequences.

Mode of Construction.—The greater part of the roads in France are macadamized ; it is only in towns that paving stones are used. The layer of broken stones composing the road is from 12 to 25 centimetres thick. This layer is placed directly on the beaten ground. In exceptional cases a layer of sand intervenes, or even stones of a certain magnitude, in order to facilitate the drainage. Sometimes the stones are undressed cobbles, such as are found in the beds of rivers or on the seashore, but this kind of pavement is seldom used now. The paving most generally used is made of hard granite, and laid at right angles to the axis of the road. The uniform paving stones vary from 10 to 20 centimetres in depth ; much larger ones are sometimes employed in the principal streets, however.

A good pavement should meet the following conditions : First, it must furnish a good foothold for horses drawing heavy loads ; second, the stones should be so placed that the wheels shall not run between the interstices for any distance ; third, one part of the pavement should not be more resisting than another.

The construction of a pavement consists at first in hollowing out the bed for the stones, and in placing a layer of sand of from 15 to 25 centimetres in thickness. The stones are then placed side by side, and the interstices filled up with sand. The operation is completed by an instrument called a *demoiselle*, which drives home the pavement and makes it regular. This *demoiselle* is a heavy rammer made of wood, and bound at the bottom, which is the larger end, with a strong iron hoop, and on each side a handle.

Repairs and Alterations.—When a road is finished and opened to traffic it is not left to itself, for otherwise it would soon deteriorate and become bad. To keep it in proper repair two operations are necessary, that of removing the waste, such as mud and dust, and that of supplying new material to replace the loss by wear and weather. To the removal of mud and dust the French give great attention.

When a road is run over freely by vehicles for several days and the weather is dry a slight layer of dust is formed. This dust annoys the passengers and the horses and renders the road heavy for traffic. If rain falls the dust is converted into mud,

producing ruts and faults of every sort, consequently the dust must be removed, and the instrument used is the broom. A well-swept road leaves no mud after rain, at least not for several days. However, if the humidity continues the road becomes at first sticky and finally is covered with mud, which should be promptly removed, as the mud makes the tracks of the wheels apparent, and as those tracks constitute a smoother surface for running on than the rest of the route other vehicles follow in them, and after awhile regular ruts are formed, which injure greatly the road. All the while, moreover, the wear and tear continues, although slowly, and consequently at certain periods the road must be repaired. As a rule wet weather is chosen for this operation, and the principle which ought to guide the roadman in his work is the avoiding of creating a special track in the road for traffic. The vehicles should run over any part of the surface to prevent the depressions alluded to.

The use of Rollers.—Formerly a road was opened to traffic immediately after construction, while the stones were yet loose ; but the inconvenience of this method has disappeared since use has been made of heavy rollers, which compress the material. A roller, or compressor as it is called here, consists of one or two heavy cylinders drawn by horses or propelled by steam. The cylinders weigh four tons, but this weight is subsequently increased by filling the large box over the cylinders with large stones. The rolling machine is first passed over the road with only its own weight, that is to say, empty, and gradually stones are added. In order to effect properly the operation the road is previously well watered. Constant repairing is required, especially after heavy rains, but the material being always at hand, the work is promptly executed by the roadman.

Basalt versus Granite.—Since 1846 the French engineers have generally used basalt instead of crushed granite on the roadways which are built for heavy traffic. This basaltic rock is found in great quantities in the adjoining department of the Haute-Loire. The basalt costs \$2.50 per cubic metre, and 300 cubic metres are used for each kilometre, or six-tenths of a mile. It is not only far better, but about thirty per cent. cheaper than the crushed granite, formerly so much used.

The cost of constructing a paved roadway is \$2.35 per square metre and the cost of keeping it in repair is eight cents per square

metre per annum, while that of a macadamized road is from five to ten cents.

The Road Service.—The road and bridge service of France is a strong and effective organization. Responsible men are employed in it, thoroughly trained, and their work is subjected to close inspection by government engineers. No part of the road system is neglected; the routes are divided into sections of half a mile to three miles in length, according to the importance of the road, each of which is confided to a man or number of men, so that every foot of the roadway is inspected daily and is kept in thorough repair.

COST OF GOOD ROADS IN FRANCE.

Average cost of building a road per kilometre	\$0,600.00
Cost of a road in the valleys per kilometre	4,000.00
“ a road in a mountainous region per kilometre	9,000.00
“ keeping in repair per kilometre and per annum	440.00
“ embanking per cubic metre	.18
“ paving streets per square metre	2.43
“ paving stones (per 1,000 stones)	48.26
“ ordinary workman per day	.58
“ man and horse hire per day	1.55
“ foreman per month	20.00
“ supervisor of roads per annum	600.00
“ engineer of roads per annum	1,000.00
“ head engineer	2,000.00

Bridges.—One striking and satisfactory feature of the French road system is that furnished by the substantial and often beautiful bridges which are seen in every place where the slightest need for them exists. These bridges are generally of stone, except in some cases where large streams are to be crossed, and then the suspension system is most frequently employed with satisfactory results. However in the case of road bridges where the span exceeds a certain limit iron is supplanting stone considerably in their construction.

The French bridges, like most of the streams which they cross, “go on forever,” and I have thought it well to submit some information concerning their cost. The subjoined estimates refer to small bridges only, less than a hundred feet in length.

ST. LOUIS TELFORD SPECIFICATIONS. 151

COST OF BRIDGES OF VARIOUS SIZES.

NATURE OF WORK.	SPAN.	LENGTH.	COST.
	METRES.	METRES.	
Aqueduct, roofed with flags	.60	12	\$117.00
Aqueduct, roofed with cut stone	.60	13	270.00
Small bridge, arched	1	18	618.00
"	2	15	618.00
Bridge, arched	3	10	600.00
"	4	11	1,000.00
"	5	10	1,200.00
"	6	12	1,650.00
"	10	14	5,800.00
"	20	6	4,900.00

The foregoing figures were extracted from the official record, and show the cost of bridges of a given class now actually in use.

ST. LOUIS TELFORD SPECIFICATIONS.

GRADING.

THE street shall be graded to conform to the grade as given by the Street Commissioner, and embankments must be spread in layers not exceeding nine (9) inches deep, the layers always commencing in such manner that the teams passing over it will best assist in rendering it compact. Before any stone, either for curbing, guttering or roadway paving is placed on the roadway, that part of the roadway shall be completely graded and shaped, and in all instances the cross grade of the roadway must be kept in perfect form and smooth surface.

SURPLUS EARTH.

All surplus earth shall be hauled away to such places within a distance . . . feet, as the Street Commissioner shall designate, and be spread according to his directions. No surplus earth shall be deposited on private property if within the limit just named it can be used on the streets or alleys or other public places. But if no such place can be found for it, it may, with the consent of the Street Commissioner, be deposited on private property, but all earth so deposited without the consent of the said Commissioner shall be measured and the amount thereof deducted from the measurement of the excavation.

BORROWED MATERIAL.

Borrowed earth which may be required in the filling of the street under contract, shall be taken in such quantities from such streets, alleys or other places outside of the street under contract, within the extreme haul of . . . feet, as may be directed by the Street Commissioner; and in all instances when surplus material is deposited on, or material obtained from, any streets, alleys, or other places, as heretofore mentioned, the surface of the fill or excavation shall be properly rounded off and shaped to the satisfaction of the Street Commissioner.

DRAINAGE.

All drains considered necessary by the Street Commissioner to carry off the water shall, when required, be made by the contractor for the work, and shall be paid for at prices agreed upon by the Street Commissioner.

STONE WORK.

Curbing.—All curbstones shall be of the best quality of limestone, from ledges known to withstand the effects of frost, free from seams and other defects, six (6) inches thick, twenty-four (24) inches deep, and at least four (4) feet and six (6) inches in

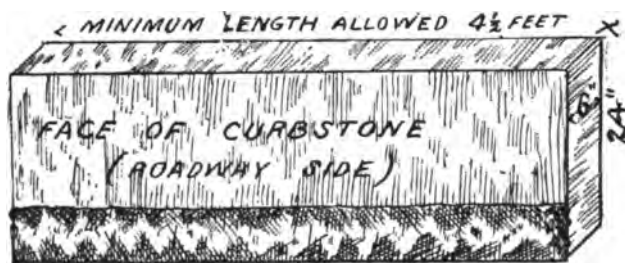


FIG. 1.—SHOWING FORM AND GENERAL DIMENSIONS OF CURBSTONE.

length, and dressed square at the ends so as to give a close joint, full width at least twenty-four (24) inches from the top of the curb. Each stone shall have a straight and even face on the side toward the gutter not less than sixteen (16) inches below the top of the curb, and towards the sidewalks not less than four (4) inches from the top of the curb.

Sub-foundation.—After the curbstones are set, the second grading and shaping of the roadway shall be done. All surplus earth and other material shall be removed and the sub-founda-

tion formed to a depth of eighteen (18) inches below the intended surface of the street, the cross-section thereof to conform in every respect to the cross-section of the pavement when finished. The road-bed shall then be rolled with a roller weighing not less than

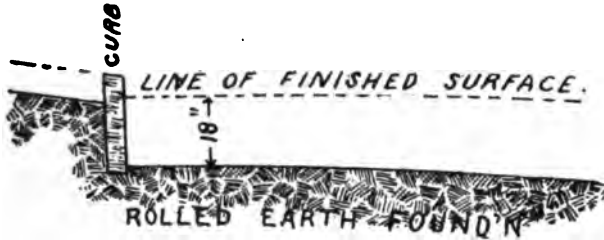


FIG. 2.—SHOWING SUB-FOUNDATION OF HARD ROLLED EARTH, WITH SLOPE OF CROSS-SECTION CORRESPONDING TO THAT OF FINISHED ROADWAY SURFACE.

five (5) tons when required by the Street Commissioner. All depressions which may appear shall be carefully refilled before any stone is put on.

Lower Course of Telford.—When the street shall be thus graded and formed, a bottom course or layer of limestone of approved quality shall be laid by hand in regular straight courses

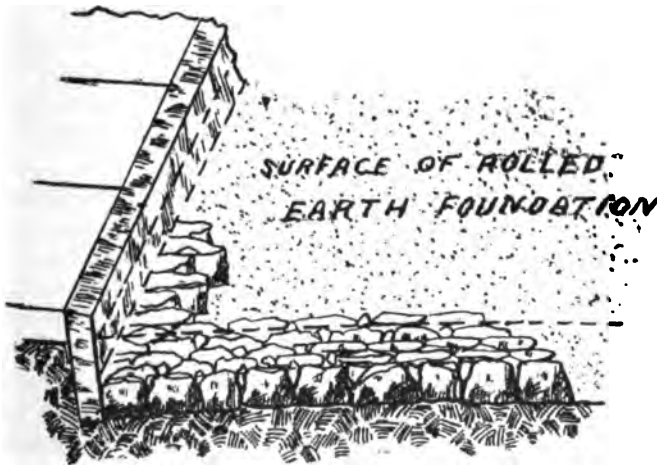


FIG. 3.—SHOWING PORTIONS OF SIDEWALK, CURBSTONES, ROLLED EARTH AND TELFORD FOUNDATION, WITH SMALL STONES WEDGED INTO INTERSTICES.

at right angles with the line of the streets, so as to break joints; the bottom surfaces of the stones shall form as close joints as possible. The stones to be used shall not be less than three (3)

inches nor more than eight (8) inches thick, and from five (5) inches to ten (10) inches long on their bottom surfaces, and must be thoroughly settled to place with hammers. The interstices shall then be filled with stone chips firmly wedged by hand with hammers, and all projecting points shall be broken off; the tops of the stones when leveled off shall have a surface not greater than one-third of the base. The foundation or bottom course when finished shall have a regular and uniform depth of not less than seven (7) inches. The bottom course along the curb and under the gutter for a width of four (4) feet, and under the cross-walk for a width of eight (8) feet, shall be thoroughly consolidated by rolling or ramming, and the surface be made even by filling the spaces between the stones with sand in such manner as the Street Commissioner may direct.

Guttering.—After the Telford foundation has been prepared the gutter shall be put down upon a bed of clean, coarse sand at least two (2) inches deep. The paving blocks shall be from six (6) to seven (7) inches deep, four (4) to six (6) inches thick, and eight (8) to twelve (12) inches long. The faces shall be straight, free from bunches, depressions and inequalities, exceeding one-half ($\frac{1}{2}$) inch. The faces shall meet at right angles and the corresponding dimensions of opposite faces shall not vary more than one-half ($\frac{1}{2}$) inch. They must be set vertically on edge in close contact with each other in straight rows at right angles with the curb, the blocks in different rows breaking joint by a space not less than four (4) inches. The joints between the blocks shall be filled at once with clean, sharp sand.

Cross-gutters.—The cross-gutters shall be of such width and shape as may be directed. The stone used therefor shall be from three (3) to six (6) inches thick, nine (9) inches deep, and from six (6) to twelve (12) inches long. The bottom course of stone shall be eight (8) inches thick, nine (9) inches deep, and not less than twelve (12) inches long.

Cross-walks.—The cross-walks shall consist of two courses of sound limestone flagging, six (6) inches thick, and each twelve (12) inches wide, and from two (2) to three (3) feet long, bush-hammered on top and dressed, with square joints and sides, and be laid firmly eighteen (18) inches apart upon a bed of clean, coarse sand, two (2) inches deep. The space of eighteen (18) inches in the centre and also eighteen (18) inches on side of the flagging shall each be paved with three (3) courses of select six (6)

inch paving stone, six (6) inches deep, and from eight (8) to twelve (12) inches long. The whole width of the cross-walk to be six and one-half ($6\frac{1}{2}$) feet. The cross-gutters and cross-walks shall be made at such points as the Street Commissioner may designate.

Quality and Finish of Stone Work.—All stones used for gutters, cross-gutters, and cross-walks shall be limestone of the best quality, from ledges known to withstand the effects of the frost, and free from seams and all other defects. All paving stone shall be dressed so as to make close joints at least four (4) inches deep, and to have a square bottom not less than three-quarters ($\frac{3}{4}$) of the superficial surface of the top of the same stone. All materials shall be fully dressed before they are brought onto the street to be improved. The whole paving must be made tight, compact and smooth, and be fully fed with sand, and must be laid true and uniform, with broken joints, and have a full bond of at least four (4) inches. After the paving is laid it must be sanded on top, the sand swept into the joints with a broom and be settled down evenly and firmly with a rammer of not less than forty (40) pounds weight.

Macadam, or Second Course.—When the Telford foundation has thus been formed, there shall be placed thereon a layer of clean, hard limestone macadam, free from clay, earth, rubbish or other foreign matter, so broken that the largest pieces shall pass through a two and one-half ($2\frac{1}{2}$) inch ring in all their diameters, and shall be fully broken before it is brought on the line of the work. This course shall have such depth and form of cross section as may be directed by the Street Commissioner, and shall be thoroughly consolidated by rolling with a roller weighing not less than five (5) tons.

Sand.—The macadam course having been finished, the spaces between the stones shall be well filled with clean, coarse . . . sand, or so much sand as may be directed by the Street Commissioner, which shall be washed in with water from a hose having a rose attached to the nozzle, and then the whole shall be rerolled to the satisfaction of the Street Commissioner; a sprinkling cart shall not be used unless it is impossible to make a connection with a fire plug, and then only with the consent of the Street Commissioner. A water license and a permit from the Water Commissioner must first be obtained before a fire plug can be opened.

Gravel.—The macadam course with binding material having been finished there shall be placed thereon a layer of good clean

gravel, free from clay, animal or vegetable matter, and containing not more than fifteen (15) per cent. of loam or sand, nor shall the largest pebble exceed one inch in diameter ; to be well wetted

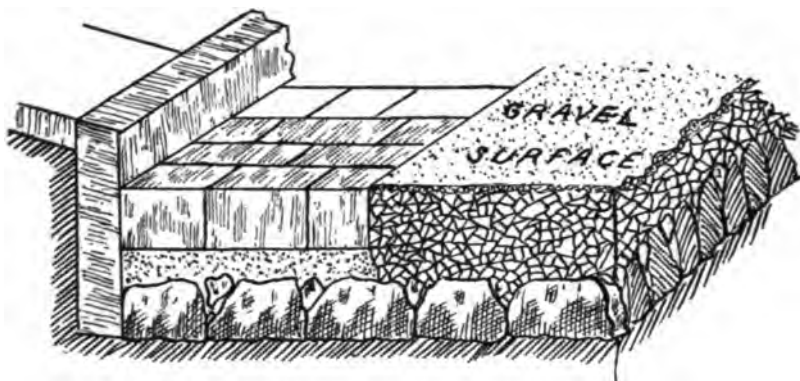


FIG. 4.—SHOWING PORTIONS OF CURB-STONE, GUTTER AND ROADWAY, COMPLETE AND IN PLACE.

down or slushed with water and thoroughly rolled to a perfect surface, having such form of cross-section and depth as may be directed by the Street Commissioner.

HOW TO DRIVE.

A FEW SIMPLE RULES THAT OWNERS OF HORSES SHOULD KNOW.

TO properly drive the light harness horse, or, as he is known all over the world, "the American trotter," there are four things which are essential for the driver to know, and which not ten per cent. of the drivers of the present day know, viz.: First, how to harness the horse ; second, how to hitch him to a wagon ; third, how to sit to look well, and at the same time ride comfortably ; and fourth, how to hold the lines. Of those who are master of the situation, know a fast trotting horse and how to handle him, the Russians come nearer to it than those of any other country ; but were we to educate and train the Orloff horse, they would have to take a back seat, as England had to do with the thoroughbred. The harness must be kept clean, which will greatly remove the danger of chafing, and particularly the saddle, which, if properly cared for, and the back of the horse well washed with clean, cold water when it is removed, there will be no danger of

soreness there. The bridle is the hardest part to be made to fit nicely, and when that is accomplished one great and often fatal mistake is very often made of drawing the throat latch too tight. It crosses the windpipe, and as the horse moves along he drops his nose a little, thus expanding the throat, breathing shorter at every stride, and finally choking completely, staggers and falls. Leave the strap loose enough for you to place your hand between it and the throat without touching either. There will be no danger of the bridle coming off, as the draught is always backward on it from the check and lines, and the bit and browband prevent it from coming back over the head. If you desire to stop and tie the animal to a post, and he is inclined to rub his bridle off, it is little trouble to draw up the buckle a hole or two, letting it out again when starting. The breast collar, also, should not be drawn up too high, as that will likewise affect the breathing. Let it come up just to the lower point of the neck and have the hip straps of a length that will bring the breeching about on a line with it. The thill loops should also be on about the same line.

In hitching to the wagon another serious mistake is often made with the breeching. How many times you will see a driver trying to get a little speed out of his horse that is obliged to go hitching and hobbling along, simply because he is tied up so tight that he cannot spread himself. When standing and the traces are straightened, there should be about room enough for a small boy to crawl through between the horse and breeching strap. He will then carry you further and faster, and do it with less effort, there being nothing to fret him.

In taking your seat in the wagon do not try to lie down, like a lady in a Victoria, but sit erect, allowing the small of your back to rest against the cushion, and bend a trifle forward. Place the feet out against the rest, and do not crawl under the seat, causing the knees to come in contact with the chin. Wrap the lap robe neatly about you, and see that no part of it is hanging out of the wagon. When the lines are taut have the hands out to carry the elbow about three inches from the body, not up to your chin, where you could not shorten your hold instantly; neither have them extended at arms' length, as, should your horse take a little hold, you cannot pull as hard or as long. Rigged in this manner, your horse is comfortable, you are ready for any emergency and comfortable yourself, besides making a

good appearance, which should be taken into consideration in this as well as in other things.

There is one rule which, if followed, will always be successful, and though it is old will do to repeat here. It is called "The Horse's Prayer":

"Up hill hurry me not,
Down hill worry me not,
On the level spare me not,
And in the barn forget me not."

But the skill in driving a single trotter is nothing compared with driving two, and one can almost count the artistic team drivers on his fingers. Dan Moore was acknowledged the crack professional when alive, but, among gentlemen who only drove for pleasure, William H. Vanderbilt was, without a doubt, the best, and, although he was classed as an amateur, there were few professionals who could equal him. At the present day his performance, driving Maud S. and Aldine a full mile in 2.15¾ to a top wagon, is considered the best by horsemen. John Shepherd, the Boston merchant, also showed himself an artist behind his crack team, Mill Boy and Blondine. The best double-team driver of the present day is C. J. Hamlin, of Buffalo. Last season, when in his 77th year, he drove Belle Hamlin and Justina a mile in 2.13¼. All these wonderful feats require, besides a perfect reinsman, a perfectly matched team, and this is a difficult part of the contract. A perfect team, above all things, must be mouthed alike; they must take hold of the bit as one; they must take kindly to each other, and if they do this and are not gaited alike, will in a short time come to each other. Their disposition must be to outdo each other, or you can never have a fast team.—*Philadelphia Record*.

A VERY BAD ROAD.

Mark Twain once told a story of a minister who had a call in the country. He had to ride nine miles over a rough road. The horse was skittish and the cart had no springs, and the poor dominie was jolted up and down until he almost wished he was dead. The horse ran away at last and threw the minister out in the road. When found, he was asked if he was hurt. He said he did not know, but he felt as if his collar bone was broken.

"If he ever went to hell," he said, "he wanted to ride there over that road because he would be very glad when he got there."

"EVANGELIST BRICK."*

AWAY up there in the mountains, at H——, our sources of spiritual enlightenment were very limited indeed. In the first place, we were so far away from civilization that it is more than probable that not one missionary in two dozen knew of our existence. Secondly, as there were no ladies in H——, and hence no sewing circles, ministers who craved society of a more refined sort than that of Sam Hiles' poker-room were inclined to fight shy of us.

Once or twice, to be sure, we had had, for a brief period in each instance, a minister all to ourselves. The first one was a brand-new, very zealous, weak-eyed, scholarly, studious, and shy young man, with a Bostonese method of handling the king's English. But this one was not happy. He might have been a star of the first magnitude at a ladies' Browning club, but at H—— he was as much out of place as the proverbial cat in a strange garret. He seemed to care little for the society of his fellow-beings, at least those in H——. The boys tried to make him feel at home, and every once in a while some one would ask him to drink, but he never did. So it came to pass that his life grew burdensome, because the boys called him "Sis," and paid about as much attention to him as if he had been a tailor's dummy. But when Hill Tobias, the big, kindly wit of the camp, on hearing the reverend cough one day, said: "Sonny, ye've got th' croup, an' ef I wuz you I'd go right back ter my folks," it settled "Rev. Sis," and next day he took the stage back to civilization.

The other one was not with us even as long as "Sis." He came a month after "Sis" left, and stayed about three weeks. He was a big, overfed, canting sort of a chap, and talked "shop" too much out of business hours. One morning something broke about the engine at the Highland Mine, and Wallace, the manager, used cuss words right in the presence of Rev. Obadiah Sweet, who then and there began—just began—a long discourse on swearing, by way of reproof. I only heard one side of the story, and that was Wallace's version. It seems that he took Rev. Sweet by the shoulders, abused him roundly as a wolf in sheep's attire, and smote him with more or less violence with the

* From the Argonaut.

toe of his miner's boot. And Rev. Sweet walked ten miles down to Redwood to wait for the stage.

One day, however, a *man*, an evangelist, came and stayed a week; and in H—— society were wrought great changes—most notable of which was the conversion of Brick Yates, one of the toughest, most profane, godless men in H——. It was the fourth or fifth night of the evangelist's stay. He had exhorted as only a true man, with his heart in his work, can; and finally asked all those who wanted to become Christians to come forward and take a front seat.

There was a moment's silence. Then arose Brick Yates, who had at first done all he could to hinder the work, and his great voice growled: "Damme, I'll jest go ye!" And he went up followed by a dozen "bad" ones.

The next night a contingent from Redwood came up and invaded the sanctuary. They were all tough, but behaved pretty well until they discovered that they were getting very dry. Then, in the most earnest part of Rev. Haywood's discourse, they rose and started to march over to Hiles'. Mr. Haywood stopped speaking and looked at them in mute appeal, but Brick was equal to the emergency. As the Redwood crowd came clumping to the door, he rose, and in a hoarse whisper, heard by every one, exclaimed: "Here! Whatinell d'you fellers mean by disturbin' these here perceedin's? Go back an' set down till th' rev'ren' gits through. Plenty time ter drink. Hear me?"

They heard, and went back to their seats, and every one of them put five dollars into the hat.

Henceforth, Brick was H——'s sole spiritual physician. He was also doctor, nurse, and general consoler to all the rough population of the camp. At the start, though he did not stop taking an occasional drink, he quit gambling and getting drunk and gradually broke himself of using strong cuss words, though a few of the milder ones he never did get rid of. At first, a few unconverted ones made fun of him, but he always took it good-naturedly, and they seeing that he was in earnest, soon let him alone.

When a chap called "Charley Ross" in some unaccountable way held four kings in a little game wherein another king was held by Buck Penrose, and lingered for five or six days afterward with a 44-bullet inside of him, Brick Yates was the one who picked him up, carried him home, and nursed him tenderly

till he died ; and Brick it was who performed the last rites, preaching a brief but forcible homily on the advantages of strict honesty.

When little Sherburne, assayer at the Highland, was sick with mountain fever, it was Brick who stopped work and stayed by his bedside three weeks, and who took the lad's body to Leadville and shipped it home. And when George Hawley, who had been Brick's enemy for years, hovered between life and death for ten days, as the result of an accident at the Columbia shaft-house, it was Yates who nursed him and brought him back from the jaws of death, a bit crippled, but strong enough to work and grateful almost to worship.

But the English company operating the Highland Mine shipped, in one day, a lot of Cornish miners—rough, brutish, ignorant fellows, far different from the splendid boys whom the crazy freaks of the manager who succeeded Wallace had forced to quit work. From this time on, Brick's work was hard, but he never faltered. All the old residents were his stanch friends, but with these loutish Cornishmen he could establish no peace, though he did all for them that he would have done for others. They had no gratitude, no finer feelings ; and though Brick used every effort to establish friendly relations with them, it was in vain.

One Saturday night there was trouble at the Highland, and Peveril, the new manager, was killed by the men and his body thrown into a gully. The word passed into the camp and Brick heard. He had known and disliked Peveril, as had every one else in camp, but his duty was clear. He saddled his bronco and rode up and got the body.

Next day we gathered down at the little cemetery to see Peveril consigned to earth. Brick had begun to read a chapter of the Good Book over the grave, when there was a commotion, and he looked up to see what was the matter. Four or five drunken Cornishmen, the worst characters at the Highland, came through the crowd, headed by Evan Evans, the leader of the last night's riot. They stalked up to Brick, but he continued his reading. Evans raised his big, dirty hand and struck the Bible from Yates' grasp. A dozen hands reached for revolvers, but Brick raised his hand as a command to refrain.

"Evans," he said slowly, "you are interferin' wi' th' work of God, but let us have no words. Cease this here trouble, an' go

yer way. I'm goin' ter bury this here feller ef I die for it." And he again reached for the Bible, but had hardly taken hold of it, when Evans raised his heavy boot and kicked the preacher's lowered arm. Like a flash of lightning Brick's hand flew to his revolver—there was a report, and Evans lay on the ground dead the blood gushing from a gaping hole over his eye.

Brick was very pale, as the other Cornishmen having been forced by the crowd to take their dead leader and leave, he continued the service.

When he had finished he looked around and said quietly : "Fr'en's, I'm sorry, but thar sh'd be no interferin' with sech matters. Tell them chaps I'll preach the service over Evans, ef they say so."

That night a shot was fired from the dark alley next to Jake Smith's saloon, and we boys, rushing out, found Brick, a wound in his chest, dying on the sidewalk.

As we carried him in and laid him on the bartender's cot, he signed to me to bend closer, and whispered : "Billy, ole boy, they've got me. I guess th' Lord wuz on my side, but nuther me n'r Him seen that skulkin' cuss in th' alley."

Ministers have come and gone at H—— since then. They have been scholarly and refined, ignorant and rough, good and indifferent ; and some of them have endeared themselves to the people of H——, now quite a city. But it is worth while, when some one is extolling the virtues of this or that good man, to hear some old-timer say : "Wa-al, mebbe so. But you jest oughter hev knowed Brick Yates. Thar *wuz* a man."





THE EDITORS TABLE

THE League of American Wheelmen is to be congratulated upon the exceptional ability and character of its new executive. Colonel Charles L. Burdett has been long enough a factor in League affairs to leave open no question regarding his force of character and strong executive qualities, and we risk nothing in predicting for him and for the League a brilliant administration. Mr. Sheridan is a strong man from one of our strongest states, and takes the vice-presidency with the warmest endorsement and support of wheelmen from all parts of the country. By men who know him best he is regarded as a man of excellent judgment, and one whose record as an officer of the Illinois Division entitles him to the loyal support of the entire League. His place on the national ticket has been well earned and will be well filled.

To speak in favor of Dr. G. Carlton Brown would be to repeat in one form or another what has been many times written and said; but writing from an intimate knowledge, drawn from personal dealings with Chief Consul Brown, we have pleasure in commending him as one of the most active and successful League officials of the day, and one whose record in his own state and in the National Executive Committee has emphasized his value to all with whom he has had official dealings. In some respects the second vice-presidency is the most exacting office in the National Executive Committee, and Dr. Brown seems to be peculiarly qualified and loyally willing to assume its duties.

THE current number of *The Forum* contains one of the most admirable and practical articles on roads improvement that it has been our fortune to read. Its author is Colonel Albert A. Pope, of Boston, and the article has a smack of energy and feasibility which marks it as the product of a trained mind, familiar with the handling of important questions in a practical and successful way. We hope it may have the wide attention it deserves.

NOTHING could be quite so astonishing as the interest (?) which some bicycle manufacturers show in the movement for better roads, and nothing more profound than the selfishness which they exhibit when asked to give their support to the cause. We have before us a letter written by the manager of the Boston branch of an English house to one of the officials of the League, in which the writer says: "We shall appreciate better roads certainly; but as our wheels are built to stand any kind of roads, our interest is not so vital as if we built weaker wheels." Well, in the language of the immortal Squeers, "here's richness!" To this enterprising gentleman, who is bidding for trade in the American market, and whose "wheels are built to stand any kind of roads," any road is good enough so long as steel and rubber will hold its own against the interminable jolting, and so long as the wheelman is content to drive sixty odd pounds of bicycle that is "built to stand any kind of roads." But from the wheelman's standpoint there is a deal of absurdity and a world of stinginess in this manufacturer's view of the question; and if the manufacturer is too short-sighted to see that good roads will enlarge the market and increase the number of riders who contribute to his prosperity, the riders themselves will shortly learn that the manufacturer and the dealer who have joined hands with him in this movement for better roads, are more entitled to his patronage than is the man whose wheels are "built to stand any kind of roads," and whose "interest is not so vital as if he built weaker wheels."

LETTERS and papers coming to us from all parts of the country indicate the awakening of a lively interest in the improvement of roads and streets, and in most of the states schemes are actively under way to encourage this kind of reform. Just here we begin to appreciate the magnitude of the work still to be accomplished. Everybody is clamoring for practical information on the subject of road building, it being everywhere

conceded that good roads are the best investment in which public money can be expended. To answer this demand for practical information we shall hereafter devote a considerable space in each issue to the subject of practical construction and repair of roads and streets, and we beg our many readers to bear with us patiently while we bend our energies to the exacting work of collecting and preparing the information which these articles will set forth.

As a rule every technical treatise is, to the average mind, dry, prosy, and unfit for popular attention. There is an element in human nature, a kind of party-colored corner in everyone's character, that loves to be eased, lightened and brightened, and fed, if you please, by the amusement and sentiment which is chiefly afforded by the kind of writing that comes of the humor and romance of a good story. We can read the work of a skillful story teller with interest and delight, and with none of that effort of fixed attention which is demanded in the perusal of a technical essay. Most of us are not thinkers, and the brain work required in the mastery of an unfamiliar subject is rarely undertaken with a relish. To use a borrowed simile, your average citizen is likely to approach the subject of practical road making "like a man sifting coal ashes in a high wind," with his eyes shut and his back to the subject. Confronted by this embarrassing obstacle in the way of our instructive work, we shall attempt to present the technical side of road building in familiar language, and to make it as palatable to the reader who reads to be informed as is a simple treatise on house building to the young house-builder who goes about the agreeable task of building for himself a permanent home. And, after all, the reader's attention will be measured very largely by his interest in the subject, and to this fact we owe our confidence that our lessons on the practical side of road and street making will not have been attempted in vain.

THE curse of machine politics seems to have turned its withering breath against the "Richardson Bill," now pending in the New York legislature. No bill has yet

been projected in the line of roads improvement which so tends to radical reform, without working hardship to the taxpayer, or injustice to the different industrial classes, as does the Richardson bill. Its author and sponsor is himself a farmer, and the bill he has framed and introduced tends not only to relieve the burdens of the farming classes, but to enhance the prosperity of the whole state. Under these conditions nothing could be more exasperating than the strained efforts of a dozen picayune tricksters in the New York legislature, to embarrass and defeat the progress of this measure. What do they want? They don't want much—simply that the non-partisan feature of the bill shall be stricken out and the commissioners made to belong to one political faith! The time seems about ripe to preach politics in the matter of the Richardson bill. One of the great political parties has full control of the departments of state—legislative and executive. To the leaders of this party we ask: What are you going to do about the Richardson bill? To the 25,000 wheelmen voters of the State of New York, and to the thousands of our farmer readers in that state, we send reminder that a great election will occur next year, and that the men who now oppose your interests will then solicit your support. What answer?

CONVICT labor, the stumbling block that has tripped many a builder of political platforms, and caused endless disturbances in the ranks of our citizen mechanics, seems likely to serve as a comfortable adjunct in the settlement of the roads question. These prisoners in the common jails and penitentiaries are always ready and anxious to work, and no form of employment could be better for them, nor for the state, than work in the open air upon the public roads.

LET us offer a suggestion. If you are interested in securing better roads, and would like to enlarge the influence of the League and encourage the improvement in your own town, hand your last copy of *GOOD ROADS* to some influential neighbor, and ask him to read it and to subscribe for it.

LAWS AND LEGISLATION

THE General Assembly of Virginia is considering a special act for highway repair in the county of Henry. The act provides that the Board of Supervisors of the county may levy a road tax not exceeding in any one year 20 cents on \$100 of the annual taxable value in the county, and "adopt such regulations as may be necessary to secure the proper working of roads in said county." The proposed act further requires that the board shall, in the month of May of each year, let contracts to the lowest responsible bidders for keeping the county roads in repair in the several districts. This letting may refer to the entire county system included in one contract, or may be divided into sections at the discretion of the supervisors. Contractors are required to give bonds to secure the faithful performance of their work, and supervisors are forbidden to have any interest, direct or indirect, in any contract awarded under this act. All persons liable to service in working the public roads under existing laws shall be required to render service to the contractors having charge of their several districts, or forfeit to him the sum of 75 cents each for each day of failure to appear. Unpaid forfeitures are collected by the officers of the town or county under process of law, and parties in arrears beyond a certain date may be arrested and placed in charge of the contractor to render service until the fines and costs are fully paid.

While some features of this bill suggest an improvement on the old method, it is evident that the Old Dominion country does not yet appreciate the ennobling features of free labor, nor the fact that this method of compulsory work as a means of squaring accounts with the commonwealth, has a disagreeable likeness to the penal features of hard labor required in the common prisons. Every able-bodied man whose time is worth anything is worth more than 75 cents a day, and a bill requiring the payment of a money tax would insure better work and greater satisfaction on all sides.

ON February 3d an important bill was introduced in the New York senate by Senator McCarty which promises a splendid system of roads for the town of New Utrecht, L. I. The bill provides, first, that all the powers and duties of the commissioner of highways of the town shall devolve upon the Town Board of Improvement exclusively, and requires the commissioner, within ten days after the passage of the act, to turn over to the board, through its executive officers, all moneys, accounts and property in his possession or under his control, so far as they refer to the affairs of his office. The office of commissioner of highways is abolished. The Board of Improvement is required to cause the principal highways of the town to be reconstructed, by macadamizing or otherwise, to such extent as may be deemed expedient. The moneys required for this purpose shall be computed, and an estimate be delivered to the supervisor of the town, who is directed to issue bonds on the public credit, not exceeding \$25,000 in any fiscal year, at interest not exceeding 5 per cent. per annum. The principal of the bonds becomes due in fifty successive annual instalments, the first of which shall date not less than four nor more than five years from the time of issue. The Board of Improvement is authorized to employ skilled persons to carry out the work, and is granted exclusive control over the public highways of the town.

We are informed that people of New Utrecht, since the introduction of this bill, have practically decided to urge an amendment permitting an expenditure of not less than \$50,000 per year, instead of \$25,000, as proposed in the original bill. James C. Church, Esq., of the King's County bar, is one of the most active sponsors of this measure, and to his earnest work are due the excellent prospects of its success.

GENERAL ROY STONE, whose project for national legislation in the direction of road improvement was referred to in these columns last month, sends us the text of a

proposed congressional bill which he has prepared, and the general features of the scheme are so meritorious that we have deemed best to print the bill in full. It reads as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

"That a National Highway Commission be created, composed of two senators of the United States to be named by the Vice-President, five members of the House of Representatives to be named by the Speaker of the House, and five citizens to be appointed by the President of the United States, together with the Secretaries of War, Agriculture and the Interior, the Postmaster-General and the Attorney-General, who may be represented by subordinates from their several departments, and an associate member from each of the states and territories that may by its executive or otherwise, appoint one.

"Sec. 2. The Commission shall continue in existence for two years from the date of its organization, and shall hold its meetings in Washington during the sessions of Congress, in Chicago during the World's Fair, and at such other places and times as a majority of all its members may elect.

"Sec. 3. The duties of the Commission shall be: 1st—To devise and formulate plans for the establishment of a National School of Roads and Bridges, with branches attached to the various agricultural colleges and experiment stations. 2d—To consider and report whether in any part of the United States military or post roads might profitably be established and built under the supervision of such national school, and as a part of its means of instruction. 3d—To report what action has heretofore been taken by the United States in highway construction and maintenance, what highways are still under national ownership or control, and what is recommended to be done for the proper maintenance and repair of such highways. 4th—To collect and disseminate general information regarding roads and their improvement. 5th—To procure the exhibition at the World's Fair in Chicago of the best methods and appliances for road making, and to provide for organized, practical in-

struction in the art during the continuance of the Fair, free of cost, to all who may desire it. 6th—To collate the various recent state laws regarding highway improvement, with information as to their practical workings, and to suggest such combination or modifications of those laws as may secure the best form of state aid to local communities in road construction. 7th—To inquire and report whether any form of national aid to the same is desirable and practicable, and especially to consider the feasibility of co-operation by national, state and county authorities in a general system of road construction, based upon their agreement in each case as to the need and character of the work, their joint supervision of its execution, an equal or equitable division of its cost, and the use of the joint credit in order to obtain the necessary funds at a low rate of interest and long term of payment. 8th—If such co-operation is approved, to report what state and national legislation or constitutional amendments are required to authorize and facilitate it. 9th—To investigate and report upon the use of convict labor in highway construction. 10th—To report whether it is practicable by legislation to regulate the construction of vehicles so as to insure the better preservation of road surfaces. 11th—To submit its views and recommendations upon other subjects connected with road improvement that may suggest themselves or be brought to its attention.

"Sec. 4. The officers of the Commission shall be a president and vice-president, who shall be members of the Commission, and a secretary chosen by the Commission, who may or may not be a member.

"Sec. 5. All members of the Commission, including the associates, shall have an equal voice in its action, but a majority, without counting the associates, shall constitute a quorum for business at any regular or properly called meeting of the Commission.

"Sec. 6. The Commission shall report to Congress from time to time, and in case of the failure of a majority agreement upon any of the subjects committed to it, the Commission shall report by sections, as its members may agree, for the information of Congress and the public."



NEWS AND COMMENT

IN the course of an excellent speech at the recent banquet of the Joliet, Ill., Business Men's Association, Judge Horace S. Clark, of Mattoon, made a strong and pertinent appeal for the improvement of the country roads.

THE Illinois Road Association will hold an important meeting at Springfield, on March 29.

The association is composed of ex-mayors, mayors, county and highway commissioners, civil engineers, Illinois Division L. A. W., and others interested. The objects of the association are: To secure legislation by which permanent hard roads may be built in each county; to demand of the legislature an appropriation equal to what each county may expend for that purpose; that convict labor shall be used in preparing road material free of cost, and such like objects as meet the approval of the convention. Carter H. Harrison is president of the association. Good country roads will save producers more in the way of getting their products to the markets than all the interstate commerce act has done for them.

THE *New Grange News*, Normal, Ill., has asked the Grangers of the state to discuss the subject of improved roads at their regular meetings, and will publish a "hard road" number on March 5, containing an account of the proceedings at these meetings. The hope is expressed that bad roads will not shut off discussion, as they have travel in some parts of that state.

H. E. CLEWELL, of Nazareth, Pa., is doing excellent work among the farmers, by means of his illustrated stereopticon lectures on "The Gospel of Good Roads." The newspaper reports of these lectures are most flattering, and state that the public halls are crowded on each occasion when Mr. Clewell is advertised to speak.

FLATBUSH, N. Y.—A large meeting of citizens was held at the town hall on the evening of March 3, to inaugurate a movement for "a

general rebuilding of the town roads," as stated in the call signed by Highway Commissioners, Balzer and Fitzpatrick. After full discussion a committee, consisting of seven prominent citizens, was appointed to formulate a plan for thorough improvement and to prepare a legislative bill authorizing the town to take necessary steps. Adjourned for one week.

HON. CLEM. STUDEBAKER, of South Bend, Ind., delivered a most convincing and forcible address on the roads question to the farmers of St. Joseph County, at their institute, held at South Bend on Feb. 17-18 last. In the course of his remarks Mr. Studebaker said:

"To my mind the government, state and national, might with entire propriety give material aid in the building of public highways. This was the doctrine of Henry Clay, and it is as good doctrine now as it was in his time. Government dollars might often be much better spent in the improvement of the roads than in deepening harbors or making creeks navigable as rivers.

"On the subject of good road making there is a vast deal to be said, much more than I would feel that I was warranted in taking up your time to listen to if I were to allude to this branch of the subject alone. You all know the average method of making a country road. A lot of neighbors in the spring of the year get together, and have a kind of picnic in plowing up the streets to a good subsoil depth, as though preparing the ground for a crop of the three-foot variety of rutabagas. The result is an ash-heap drive of greater or less extent, which commonly does not become solid in reasonable going short of autumn. I do not mean that this is so in your road district, but that is the way they do things over in the neighboring district. Road making is a science, and it is by no means as yet thoroughly understood, even among professionals. No doubt good roads can be made by the average engineer if he has an unlimited supply of material for the purpose and ample means to carry out his ideas in road building, but the thing, I take it, that interests the farmer in St. Joseph County in this connection, is the problem of making a good country road with the least possible expenditure of time and money. If large stone quarries could be easily reached, no doubt the best durable road that would be within the means of the farming communi-

ties, would be broken stone, but taking conditions as they exist, we must for the present look to the gravel beds for the material with which to build our roads."

MISSOURI is more alive than ever. Greene County has a County Road Reform Organization, with a complete set of executive officers and working committees. We have before us a most interesting letter addressed by H. E. Howell, Esq., of Springfield, chairman of the Committee on Laws, to Chief Consul Holm, in which the writer says: "Our convention held here for this county was enthusiastic. I took quite an active part and am chairman of a committee of three lawyers, two engineers and four farmers, to devise the best law for this state to build macadam and gravel roads. The state convention is to be held here during May 4th and 5th next, and not less than three delegates will represent each county. I propose to do my share, for there is nothing I can do for my county and state which, in my opinion, will be of more benefit to them financially and otherwise."

THE Wisconsin division of the League, under the zealous leadership of Chief Consul Simonds, is carrying the roads improvement question so rapidly to the front that other public questions are giving way to its consideration. The University of Wisconsin advertises the sixth session of the Wisconsin Farmers' Institute, at Portage, on March 16th, 17th and 18th, when the following addresses will be made: "Highways and National Prosperity," Stephen Faville; "How Shall We Improve our Country Roads?" Hon. John Dawson; "The Importance of Good Roads," Hon. B. E. Sampson; "A Road Epistle to the Farmer," B. H. Meyer; "Roads from an Engineer's Standpoint," Prof. C. B. Wing.

The above programme will be followed by a general discussion on road matters.

ILLINOIS is preparing to hold a monster road convention at Springfield on March 29th and 30th. Chief Consul Gerould and his able staff of Illinois division officers are pushing their influence into every corner of the state with most excellent results. The Illinois politician is beginning to test the direction of the wind, and there seems to be a concerted movement all along the line to

tackle those endless streaks of Illinois mud, which keep the farmers at home and tie up rural business for ten weeks every year.

THE people of Abington Township, Pa., are discussing the question of macadamizing all the important roads in that section. They held a large meeting last month and discussed the question somewhat fully. It was there demonstrated that the repairing of town roads cost about \$18,000 a year, and that this money is practically thrown away. Forty miles of good roads in that township would cost about \$200,000, which could be raised on bonds at 4 per cent. interest. Total interest, \$8,000 per year. Add \$4,000 for repairs and redemption fund, making a total of \$12,000, as against \$18,000 now spent on the dirt roads. Here we have a moral figured out in cold arithmetic.

HON. J. L. ERWIN, of Fulton, Mo., has just completed an extended series of addresses to the farmers of that state. He has visited every important section, and his efforts have been largely directed to presenting the question of improved roads to his farmer hearers. Best of all, the Missouri papers along the line of Mr. Erwin's route have taken up the question and have printed, with favorable comment, the substantial portions of his many addresses. Missouri is really going about this work in a manner which puts to shame the indifference of some of the wealthier and more populous states.

BRICK pavements for street roadways are growing in favor, and it seems not a little strange that the value of this excellent material for this purpose should not have been appreciated many years ago. Bricks are said to have been used in Holland and Belgium for street pavements for over a hundred years, and for a similar length of time in Staffordshire, England. That they are adapted to heavy traffic is proven, not only by severe tests in this country, but by the fact that they have been used for many years in London for paving the approaches to freight depots, where the traffic and vehicles are exceptionally heavy. In the same way they are used in Columbus, Ohio, and Chicago, Ill. Cleveland and Philadelphia have together over seventy miles of brick pavement, of which Cleveland has about two-thirds.

Other American cities using this pavement in greater or less degree are Wheeling, Johnstown, Indianapolis, York, Baltimore and Pittsburg. The cost of brick pavement runs from \$1.50 to \$2.25 per square yard.

A new pavement called a steel wood pavement has been brought out and will compete with brick pavement for popular favor; but although claimed to be the cheapest and best, the popular prejudice against wood, especially in the Eastern cities, will be likely to militate against its rapid adoption.

AT Lee, Mass., a County Grange recently discussed the road question with much earnestness. One speaker voiced the sentiment of the meeting in saying: "To draw a load through mud takes power; the horse knows it if you do not. That power costs oats. The poorer the road the less you can get from a horse with a given cost for food. The dirt road system must go. Let every farmer help to abolish this nuisance and this big item in his expense account."

The sentiment of the meeting was asked on the advisability of employing prison labor on our roads provided it could be done practically, and also as to the advisability of asking the state or national government to assist in building and maintaining good roads. The vote was 20 to 1 in favor of both.

THE business men of St. Joseph, Mo., have raised \$4,000, as the nucleus of a \$28,000 fund to be used for thoroughly macadamizing one of the important suburban roads. The County Court will be petitioned to appropriate \$21,000 of the necessary sum.

THE Connecticut farm roads have been so bad this winter that the frugal people of that state haven't been able to haul enough wood to keep up the supply of nutmegs. Hon. Geo. Austin Bowen, Master of the Connecticut State Grange, in an admirable address delivered at the seventh annual session, treated the road subject in the following practical language:

"The highways of Connecticut, taken as a whole throughout the state, and compared with our wealth, are the worst of any of the eastern states, due entirely to, first, the faulty town system, or more properly speaking, lack of system, and second, to a false idea of economy, the spring repairs being made late in the season and of the simplest nature, and entirely destroyed by the first hard rain. If

I were asked to give a definition of a country road, I should say it is an imaginary pathway, composed of fearfully realistic quagmires, washouts, thank-ye-mams, cobble stones, and profanity. I challenge an opposition to these statements, and make a further assertion that if the control of the roads were taken from the towns and assumed by the state, a per capita tax being taken for their maintenance, it would cost no more, and possibly less than at present, and would give us a system of highways that we would be proud of, and upon which our teams could travel at all seasons of the year, lessening our tractive force, one animal being able to do the work of two, saving our time and practically moving every farm in the state several miles nearer the market or the railroad.

"We shall never have good highways in Connecticut, with solid road-beds, free from mud and dust, with proper bridges, culverts, and drainage, and properly adorned highways, till this is done; local prejudice is too strong; it does not admit of straightening roads, leveling hills, opening drains, and the removal of unsightly obstacles, or of any adornment. The Grange is working for the future of agriculture as well as the present. With good roads we know it will be enhanced, for over them it can obtain wealth; with poor roads we know that our grandchildren will still be struggling with poverty and 'cussing' the selectmen. Think of and discuss this question, patrons, and when the question comes, as it surely will, act on the side of progression and not ancient conservatism."

THE League of American Wheelmen are engaged in a laudable work in their crusade against bad roads. It is an undertaking that concerns all who use public roads in any manner, whether with bi or tricycles, carts, wagons, buggies, carriages or other wheeled vehicles, or are simple pedestrians. The proposed collection of funds for the distribution of information on the subject is, perhaps, the best way to begin the crusade.—*Washington Star*.

FARMERS lost on an average six cents a bushel on the wheat they have marketed since the 1st of January because they couldn't reach the city with it prior to Christmas on account of the miserable condition of the roads. And yet if they had been taxed one-half of the amount lost for the building of permanent highways they would have deemed it excessive taxation. One cent a bushel on all the corn, two cents a bushel on all the wheat, and ten cents per ton on all the hay raised in Illinois territory tributary to Warsaw would build ten miles of permanent roads in one year, or one hundred miles in ten years, thus, in a little while, giving the farmers of this vicinity a network of highway passable at all seasons of the year.—*Warsaw (Illinois) Bulletin*.

QUERIES AND ANSWERS

"F. & M."—We are now arranging with dealers for the publication of lantern slide views of all photographs of bad roads of which we have negatives, and these we shall send out from this Bureau at cost, for the use of our friends who desire to use them. Magic lanterns and stereopticons vary in price from a few dollars to several hundred. We should advise you to get pricelists of the dealers and manufacturers, most of whom advertise in the illustrated papers and some of the monthly magazines.

"ALDERMAN J."—The Belgian block pavement is well adapted to heavy traffic, and is largely used in American cities, as well as abroad; but it is too often carelessly laid and frequently taken up in places for the laying of pipes, etc., by contractors and private parties, who are not required to properly relay the pavement. The result is a poor pavement, whereas the work, if properly overseen, might have been made and kept in excellent condition. This form of pavement is generally preferred to smoother pavements in places where it is likely to be subjected to hard usage; but for streets used mostly by carriages, the smoother pavement is generally preferred. Both the asphalt and vitrified brick pavements are good, and in some localities wood pavements have done good service. We shall treat fully of these in a later number of GOOD ROADS.

"CANARSIE."—The improvement of a clay road, without the use of other material, is not an easy task to undertake, because clay, especially the heavier kind, tends to retard drainage rather than to facilitate it. If you have no gravel close at hand, you had better use the road machine and give your road surface a generous slope towards the side ditches and, by scraping and rolling, keep the surface in as smooth a condition as possible, so as to insure rapid surface drainage; but if coarse gravel or stone can be had, by all means provide an ample centre drain, giving to your centre ditch broad flaring sides, sloping from the bottom of the ditch

upwards and outwards towards the sides of the road. Lay a line of drain pipe or tile at the bottom of the ditch, with proper grade to carry the water to the nearest valley or stream into which it may empty its contents. Protect the drain pipe by a covering of straw or coarse marsh grass and fill your ditch with stones or gravel, putting the coarse material at the bottom. We shall treat of this subject in an early number of this magazine.

"VARNEY."—The business house mentioned in your letter has an excellent reputation, both for the quality of its products and its business methods. It is our aim to accept advertisements only from concerns in good standing and from those which we feel ready to recommend.

"R. S. J."—See reply to "M. M." in February number.

"FOSCO."—We cannot vary the terms of competition for prizes for obtaining paid subscribers for GOOD ROADS. If you would like to obtain subscribers on commission, we make liberal terms for that purpose.

"M. V. S."—Send us your full name and address and we will send you information regarding the League of American Wheelmen. It is too voluminous to be included in these columns.

"FRED."—Breaking stone by hand for macadam produces good results, but the operation is too costly except in cases where labor can be had at the lowest rate. You can buy a stone crusher or breaker, capable of turning out from six to twelve net tons of broken material per hour (according to the character of the stone) for about \$800, or perhaps less. To drive this machine you will require an engine developing from twelve to fifteen horse-power, which will be sufficient to run a screen also. If you choose to use a more powerful engine, so much the better, especially if fine breaking is to be counted on. In ordering a breaker, be sure to state clearly what kind of rock you intend to break, and how fine.

CONTRACT NOTES.

—The City Council of Tacoma, Wash., has voted to improve twelve streets.

—North Amherst, Ohio, will soon expend about \$8,000 in street improvement.

—Atlanta, Ga., will spend \$150,000 for street paving during the present year.

—Detroit, Mich., will spend \$500,000 on street pavements during the present year.

—Richmond, Ind., has adopted vitrified brick pavement for the new improvement in Main street.

—The city authorities of Indianapolis, Ind., are preparing specifications for street paving and improvement.

—Toronto, Canada, put down over nine miles of cedar blocks and about two miles of asphalt pavement last year.

—The estimated cost of street improvement at Lynchburg, Va., is something more than \$20,000 for the year 1892.

—The Massillon, Ohio, authorities have just awarded a contract for paving one of its streets with vitrified brick.

—Mount Vernon, N. Y., has awarded contracts for paving its principal thoroughfare, South Fourth avenue.

—Charleston, S. C., has awarded contracts for 7,000 feet of flagstones to be put down in various parts of the city.

—Racine, Wis., is about to advertise for proposals for paving about one mile of streets with cedar block pavement.

—The city of Nashville, Tenn., has recently audited bills amounting to about \$20,000 for granite and brick pavements.

—Center street, Wallingford, Conn., is to be Macadamized from the Town Hall to Simpson's factory as soon as warm weather begins.

—Among the mayor's estimates of local expenses for the ensuing year at Boston, Mass., is the item of \$850,000 for new street pavements.

—In Harrison, Ohio, the Municipal Council has taken steps to improve Calvin, Dock and Jefferson streets by guttering, grading and Macadamizing.

—Alliance, Ohio, put down two miles of brick pavement last year, as a supplement to the six miles of Macadam streets previously constructed.

—Allegheny City, Pa., contemplates an expenditure during the present year of \$90,000 for streets and \$114,000 for sewers and suburban roadways.

—The people of Hackensack, N. J., are agitating the question of additional Macadamizing, and it is now proposed to bond the city for the purpose of completing the work on all important streets during the present year.

—Vitrified brick has been adopted as pavement for one of the important streets at San Bernardino, Cal.

—Waco, Texas, has just sold \$100,000 in street improvement bonds, and the products will be actively devoted to the purposes for which it was raised.

—Findlay, Ohio, is contemplating the issue of \$150,000 worth of bonds for street improvement, and a legislative bill has been prepared to authorize this loan.

—At Los Angeles, Cal., bituminous limestone will be used as new pavement in one of the important streets, and several others will be graveled at an early day.

—At Somerville, Mass., the Committee on Highways is preparing estimate of cost for paving Somerville avenue, Union square and a part of Webster avenue.

—The official estimate of the city engineer of Springfield, Ohio, for new pavement places the aggregate amount at about 8,000 feet, and the cost at about \$95,000.

—Improved street paving is being actively urged by the citizens of Hamilton, Ohio, and it is likely that this discussion will end in a practical movement before long.

—Jersey City, N. J., has awarded contracts for improving Jackson avenue, Ninth street, and Eleventh street. Charles O'Neill and Henry Byrne will do the work.

—At Quincy, Ill., an ordinance has been passed requiring Union street to be paved with brick, and it is quite probable that Clyde, Ohio, will follow suit at an early date.

—Brick pavements are being extensively adopted among the Indiana cities, and the City Council at Evansville has just ordered this kind of pavement for nine streets.

—The question of expending \$75,000 for street improvement will be submitted to a vote of the citizens of Homestead, Pa., at a special election to be held for that purpose.

—Half a million dollars will be spent by the city of Toledo, Ohio, on boulevard improvements during the year 1892. Besides this new stone sidewalks will be laid on Broadway.

—San Francisco, Cal., has just awarded contracts for something over \$40,000 worth of street work, of which the largest item was included in the contract to Warren & Malley at \$25,000.

—The Clerk of the Board of Public Works at Allegheny City, has been directed to advertise for bids for 2,000,000 hard burned sewer bricks to be delivered during the present year.

—The Council of Kissimmee, Florida, has directed that wood, brick and stone sidewalks be constructed on the three principal business streets. It is believed that wood will be largely used.

—The city engineer of Troy, N. Y., is preparing specifications for asphalt pavement on Sixth avenue, from Rensselaer street to the city line, and on Seventh street, from State to Grand street.

—New Castle, Pa., is contemplating an expenditure of \$250,000 for improved street pavements: \$50,000 of this sum will be paid by the city at large and the balance by the property directly benefited.

—Lockhaven, Pa., is considering the scheme of appropriating each year \$10,000 for paving, in addition to the ordinary outlay required for street repairs. The estimated cost of paving Union street has just been fixed at \$15,000.

—A new city charter has been granted to Fleetwood, Pa., and extensive street improvements are expected in that city as soon as the weather will permit of active work. The feeling of the citizens is strongly in favor of local improvement.

—The authorities of Savannah, Ga., have received an offer from the Warren & Scharf Asphalt Company to furnish the asphaltting of Bull street and wait till September next for payment. The cost will be about \$25,000, exclusive of curbing.

—The city engineer of Cincinnati, Ohio, recently completed estimates for improving seventeen and one-half miles of the public streets of that city, and fixed the amount at about \$392,000. Specifications will be prepared and contracts awarded within the next few weeks.

—Louisville, Ky., will spend money for street improvement during the coming year as follows: In the easterly district, granite, \$482,000; brick, \$197,000; asphalt, \$32,000. In the westerly district, granite, \$585,000; bowlders, \$15,000; brick, \$219,000; asphalt, \$375,000.

—Chippewa Falls, Wis., has just contracted with Minneapolis parties for 15,000 square yards of cedar block pavement, casting about \$20,000, which includes price of grading and curbing. The curbing will extend over about 6,000 lineal feet and will be of berea sandstone.

—Ten bids have been received by the Commissioners of Washington, D. C., for furnishing the district with vitrified brick. The lowest bid was that of McMahon, Porter & Co., \$17.93 per thousand for pressed brick; and the lowest for ordinary brick was that of the American Fire Clay Company, at \$17.72 per thousand.

—Superintendent Burke of Chicago, having examined the methods of street paving and repairing in the eastern cities, returns home with the statement that Chicago is much behind in the matter of street paving, and states his opinion that the trouble is due to the fact that Chicago pavements are put down in too much of a hurry.

—The Street Committee of Athens, Ga., are preparing to lay 41,000 square yards of Belgian block pavement, 25,000 square yards of Macadam pavement, 17,000 lineal feet of curbing, 7,000 lineal feet of gutter sluice and 3,000 feet of crossing. The work will be paid for in city bonds of the denomination of \$1,000 each, drawing five per cent. interest. J. W. Barnett is the city engineer and will furnish further information.

—The city of Duluth, Minn., is about to construct an iron and steel viaduct on Lake avenue. The length will be 684 feet and width sixty feet. Contractors are required to send with their bids certified checks for a sum not less than ten per cent. of the amount of proposals, or a satisfaction bond of not less than twenty-five per cent. Particulars may be had by addressing T. W. Abell, Clerk of the Board of Public Works.

—Bids for widening Congress street, near the Kellogg currycomb factory, at Troy, N. Y., have been opened. Joseph H. Cavanaugh, \$1,100; Donovan & Darby, \$1,325; Gilbert W. Flagler, \$625; Richard M. Redmond \$945; George Winnie, \$595; William McLaughlin, \$487, were the bidders and the amounts of their bids. William McLaughlin was awarded the contract.

—Sealed proposals in duplicate will be received at the office of the County Commissioners of Pulaski County, Ga., until 12 o'clock A. M., the 22d day of March, 1892, for removing the fixed iron highway bridge across the Ocmulgee River, Georgia, and constructing in place thereof an iron or steel drawbridge. For all necessary information apply to D. G. Fleming, Clerk of the Board of Commissioners, at Hawkinsville, Ga.

—Hannibal, Mo., in response to advertisements for proposals, has received bids for paving Broadway with vitrified brick, covering an area of about 28,000 square yards, as follows: T. J. Shea, Quincy, Ill., \$57,062.32; J. B. Smith, Chicago, Ill., \$57,347.75; F. W. Menke, Quincy, Ill., \$57,357.81; Becky Glann, Toledo, Ohio, \$60,715.44; Rose & Reynolds, Hannibal, Mo., \$63,104.75. Mr. Shea's bid being the lowest, he was awarded the contract. He is to furnish all material, labor, etc. and have the work, as specified, completed on or before September 1, 1892.

—The Board of Supervisors of Queens County, N. Y., have approved plans and specifications for grading, Macadamizing and improving three miles of highway between the villages of Flushing and Jamaica. Plans may be seen at and specifications obtained from the office of the engineer, G. A. Roullier, No. 20 Main street, Flushing, N. Y. Bonds in the sum of \$10,000 will be required. All proposals must be made out on the blank forms provided for the purpose, and must be accompanied by a certified check in the sum of \$2,000. Further information can be obtained of Robert Seabury, County Court House, Long Island City, N. Y.

—Mr. Harvey Linton, City Engineer, makes official report as follows: From 1888 to 1891, 106,593 square yards of paving were laid in Altoona at a cost of \$302,100, of which 52,197.9 square yards were sheet asphalt, 22,876.1 asphalt block on concrete foundation, 14,464.4 asphalt block on stone foundation, 4,082.6 stone block on concrete foundation, 9,459.5 stone block on stone foundation, 3,983 vitrified brick on concrete foundation, 1,537.9 vitrified brick on stone foundation, 1,576.3 cobble stone. The details of this statement have been put in unusually comprehensive form, and will accompany the annual report of Mr. Linton, which has not yet been published.

—The board of improvement of Flatbush held an adjourned meeting in the town hall last evening, President Christian Schaffer in the chair. Commissioner James Ryan, Peter L. Williamson and Jacob P. Vanderveer were present. The board unanimously awarded the contract for the improvement of Nostrand avenue from the center line, Lincoln road, to the center line of Vernon avenue, with broken stone, to Frederick Lick of Flatbush, at \$2.98 per lineal foot, the contractor to sign a stipulation to finish the work in three months. The assessment commissioners, Alfred E. Steers, Freeman Clarkson and F. E. Schultze, will now proceed to designate the line of assessment for the improvement. The board then adjourned. Mr. Lick is the contractor for the grading, paving and curbing of Flatbush avenue.

BORROWED WIT



THE NEWSPAPER-AFFIDAVIT LIAR.

The snake-liar and the fish-liar, both bowed in their gray old age,
Came traveling back from their journeys wide, from their earth-wide pilgrimage;
A tear-drop stood in the snake-liar's eye, and the fish-liar groaned in pain,
And a death-like look of infinite grief came over the face of the twain.

"I cannot compete with the modern liar," the sad-eyed snake-liar said,

"In its limitless length and breath and depth, and I wish that I were dead;

For I stand rebuked, with a shame-faced look, 'neath the triumphant gaze of the eye

Of the newspaper-affidavit liar, with his circulation lie.

"For the snake-liar and the fish-liar and the horse-liar own his sway,

And the easy-going liars who work by the job, and the liars who work by the day;

The traveling liar, old-inhabitant liar, and liars of low degree.

And liars who lie for the fun of the thing, and liars who lie for a fee.

"The horse-liar, the peach-crop liar, the sea-serpent liar and all,

With the wide untraveled wastes of cheek and their soulless seas of gall.

All bend the knee to the sceptered sway of this crowned and peerless one,

And the father of lies looks tenderly down on his most accomplished son!"

—Unidentified Poet, in *Printer's Ink*.

NOT QUITE THE WORST.

Illinois Man—I am told the worst roads in the world are found in your state.

Missouri Man (indignantly repelling the insult)—It's an infamous slander! They're in Arkansasaw. Ours are the next worst, sir!

—*Chicago Tribune*.

A DELAYED CHRISTENING.

Rubenstein—Vat you gif der baby dis year?

Feldkahn—Ach, ve vos shly like foxes. Ve wait till Gris-mas unt gif him his name.—

Exchange.

BEFORE AND AFTER.

Three sweet maidens sat in a row,
With three grim dragons behind 'em;
And each sweet maiden had a young beau,
And all of 'em made 'em mind 'em.

But those three maidens are matrons now;
In three brown-stone fronts you'll find 'em
All alone: for since the very first row,
They can none of 'em make 'em mind 'em.

—*Life*.

THIS advice was given by an old lady to a young wife going out to the colonies, and looking for a maid to accompany her. "Take a pretty one, my dear," said the old lady, "for, ugly or pretty, she will have an offer of marriage before she is out a week; and, while your ugly girl will say 'Yes' to the first offer she gets and leave you, your pretty one will be harder to please, and say 'No' several times before she consents."—*Argonaut*.

A VERBAL GURGLE.

In the swailful swirl of the soughful wind, as the gust goes glooming by, I sit by the bole of a baneful borch, with a moan and a soulful sigh. The mellowing mists of the eye are low, and the frog in the dankful marsh chirps chirpingly sad in the ghoulsome gloom, in a swivering voice and harsh:

"Oh, where is the swing of the swoonful swish,
And the voice of the flam-flam foul?
Methinks it moans from the murky mould,
And the home of the hootful owl."

Now, swivel me swift from the surging spring; I'm weary of wold and wind. The grewsome graik of the jobberwock comes jimmering to my mind. The feeble song of the sportsome frog comes solemnwise soughing slow, and again I hear by the bournful birch the wail of his wimpled woe:

"Oh, where is the swing of the swoonful swish,
From the land of the springful sprole?
Must the blue mists blur on the drinkful drale,
And freight with their frought my soul?"

—*The Bradford Era*.

AN INFALLIBLE REMEDY.

She had suffered with the phthisic, and had taken tons of physic,
 And whole barrells of bitters, and whole loads of nauseous pills;
 She's been troubled with miasma, and all choked up with asthma,
 And has been shaken for a month or two with ague and the chills.
 She has had the yellow fever, of which nothing could relieve her,
 And the rheumatism lamed her so she could not go about;
 And she groaned with tonsillitis, and the most acute bronchitis;
 And she suffered endless tortures from the twinges of the gout.
 She had tried old school physicians, Christian scientists, magicians,
 Indian doctors, electricians, and magnetic healers all;
 And drank tons of nauseous liquor, but grew ever sicker and sicker,
 And they got the undertaker to prepare her shroud and pall.
 Then great auction sales of laces advertised in various places
 Caught her feverish eye one morning, and she leaped up sound and well;
 She shook off death's stiffening rigor, and with most emphatic vigor,
 She grabbed her husband's pocketbook and rushed down town pell mell.

NOT SO VERY SMALL.

Mrs. Chugwater (while the congregation is passing out)—Never mind it, Josiah, you make such a tremendous fuss about little things!

Mr. Chugwater (still clawing about under the seat for Mrs. Chugwater's overshoe and getting madder every second)—Do you call anything you wear on your feet little things, madam?—*Chicago Tribune.*

NOT SURPRISING.

I had a little pony,
 The hostler called him Bill;
 I lent him to a Bowery girl
 To ride to Cherry Hill.
 She found the streets were full of mud,
 And all torn up beside;
 And now she wont pay me because
 She says she couldn't ride.

—*Truth.*

MRS. CALLAHAN—I want to get a pair of shoes for the little bye.
 Clerk—French kid!

Mrs. C. (indignantly)—Indade not. He's me own son—born and bred in Ameriky.—*Life.*

A QUESTION OF PRONUNCIATION.

Teacher—Now, this is a symmetrical figure; can anyone tell me what symmetry is? Ah! there is a boy with his hand up. What is symmetry, little boy?

Little Boy—Plaze, sor, it do be a place where they buries dead pape.—*Merchants' and Manufacturers' Journal.*

WINTER ON THE FARM

I have just about decided
 It 'ud keep a town boy hoppin'
 Fer to work all winter choppin'
 Fer a old fireplace, like I did!
 Lawvz! them old times was contrairy—
 Blame backbone o' winter, 'peared like,
 Wouldn't break! and I was skeered like
 Clean on into February!
 Nothin' ever made me madder
 Than for pap to stomp in, layin'
 On a extry forestick, sayin'.

"Groun'hog's out, and seed his shadder!"

—*James Whitcomb Riley, in Indianapolis Journal.*

ENGLISHMAN—Pardon me, sir, but where do you come from?

Paddy—From County Cork.

Englishman—Then that accounts for your brogue.

Paddy—May I ax where you come from?

Englishman (proudly)—From Worcester, sir.

Paddy—Then that accounts for your sauce.

SCOTTISH PROVERB.

(Vol. viii., p. 185.)

Had you seen this road before it was made,
 You would hold up both hands and bless General Wade.
 Parallel to this is another old rhyme:

This road is not passable,
 Not even jack-assible.
 Ye who would travel it
 Must turn to and gravel it.

—*American Notes and Queries.*

"THESE monkeys," said Chappie, at the Zoo, "remind me of my schoolboy days."
 "There's a faint resemblance yet," said Laura, gazing first at Chappie and then at the monkeys.

THE glance of an observing woman does not pierce a man at any spot; it surrounds the whole of him at once impalpably. It is gone before you can declare that she looked at you. But the glance was an estimate; it cost her scarce a second to peruse every cubic inch of you.



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VOL. I.

❖ APRIL, 1892 ❖

NO 4.

An illustrated monthly
magazine devoted to
the improvement
of the public roads
and streets



"There is nothing in this country
upon which so much money is expended,
where there is such an exhibition of
ignorance, lack of system and looseness
of expenditure, as there is in the repair
of country roads."

U. S. Senator, J. N. Dolph.

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ISAAC B. POTTER
Managing Editor
PUBLICATION OFFICE
POTTER BUILDING NEW YORK

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NEW YORK.

PHILADELPHIA.

GOOD ROADS.

Vol. I.

APRIL, 1892.

No. 4.

ROADS OF THE WESTERN STATES.

By Hon. John J. Ingalls, of Kansas.

WESTERN roads are much like the roof of the cabin of the Arkansas Traveler, which did not leak in dry weather, and when it rained could not be repaired. Nine months every year the prairie highways are the best in the world. Firm, elastic, without rocks or stumps, following easy grades, and drying rapidly after showers, they require only side-ditching and culverts to make them perfect for

man, wheel and beast. The other three months, when the frost is leaving the ground, during continuous rains, in Spring and Autumn, or while rough frozen, nothing worse can be imagined. Instead of giving facilities for travel, they are an obstacle and barrier, being more impassable than the fields and farms through which they run. Intercourse between neighborhoods, and local traffic, are frequently, for weeks, absolutely suspended by the tenacious mud and unfathomable mire. It goes without saying that this condition is costly, in-



PHOTOGRAPH BY C. M. BELL, WASHINGTON.

convenient and discreditable, and ought to be corrected, but permanent improvement cannot be expected while the present shiftless, improvident and irresponsible methods prevail. Patching and plastering by district and township overseers and supervisors once or twice a year is waste of money and labor.

Intelligent and comprehensive control by the State is indispensable, and too much should not be anticipated even of this.

The public roads of England and the continent are the growth of a century, and, like those of Rome, were developed before railways had become the principal avenues of communication. It should be remembered also that the climate and soil are different; the supply of labor there is greater and the rate of wages less; land is much more valuable and population more dense. It would be a mistake to attempt to construct in this country immediately a system of macadamised highways like those between Oxford and Reading in England, or Bantry Bay and Killarney Lakes in Ireland. The work must be gradual, and public opinion must be brought by degrees to this high standard.

Great irritation results from the employment of convict labor in competition with private enterprise in the making of boots and shoes, wagons, furniture and other wares. The resentment of the mechanic and artisan and of the manufacturer is not wholly without foundation. Convicts should not be supported by public taxation in idleness, thus imposing a double burden on society and putting a premium on crime itself. A wiser plan would be to keep them at work on great thoroughfares, radiating from the capital of each State to its boundaries, and in the preparation of material for their maintenance and repair.

The following pathetic petition was recently sent to a town council in Ohio :

"I, Solomon Durbin, as I was leaving town on the 18 of Nov. on the corner of Main and Gambier St. at Laterbuags grocerie I was struck with Mis Caty Young's bisicle as she was going to the B. And O. Depo I was nocked About six feet and had one Rib Broken and two iff Not three Cracked or split and also I received other injuries My Left year has Bin Deff since that time iff you want an More evidence on this Please call yours truley. SOLOMON DURBIN."

—*Associated Press.*

HIGHWAYS OF RHODE ISLAND AND THE EAST.

By Hon. John W. Davis, Ex-Governor of Rhode Island.

THE public roads of our state, and their condition as at present, are the outcome of circumstances of the past—now obsolete—and what is true of ours is true, speaking generally, of all the seaboard state roads from Salem to St. Augustine, which last, in the narrowness of its streets (one of which, "Treasury," is but seven feet wide, and several others being less than fifteen), is a telling, if exaggerated, exemplification of the ideas of highway needs in colonial times.

In their early settlements the colonists had no adequate conception of the future developments and demands, either of

their towns or highways, and neither can be said to have been laid out or constructed with an intelligent forecast of the future, but both were left, like "Topsy," and "just grewed," until now, our towns, like certain orders of periodic crustaceans, are taking an earnest wrestle to cast off their old shells in order to take on a wholesome new and vigorous growth; and in no feature is this phase more evident and essential than in the broadening and rebuilding of streets and roads.



HON. JOHN W. DAVIS.

Wherever we go to-day

through live towns, we find them linking and lengthening, widening and straightening their avenues, and laying them down upon substantial macadam foundations, and no one questions the wisdom or public economy of the undertakings.

In earlier days the settlers had no means or thought of distant travel or transportation, except by water, and they located their plantations and farms upon navigable waters, or as convenient thereto as possible, and left all intercommunication

by land to horsemen, *via* bridleways, or ox teams, which, slow and toilsome, meandered with their heavy wains from farm to farm, and thus became the unconscious engineers of our town and country roads, in all their narrow, varied, winding ways.

But with the last transcontinental emigration from the states to California, the patient ox, as an engineer and motive power, completed his mission of well fulfilled duty upon the highway. All honor to his memory and grand accomplishment. I hardly know what our fathers could have done without him, but now certainly his usefulness in that direction is gone, and the winding up-hill and down-hill road in ruts should go with him.

The present age is speeded up to both steam and electric motors for long distance travel and transportation, and as a right fitting adjunct for short distance conveniences, the horse and the cycle and pedestrian must have better public roads, or the communities neglecting these will fall as far in the rear of the great march of progression as our ancient seaports of transportation are to-day behind the great railroad centres, which have so far outstripped and distanced them in the race.

It would certainly be unwise to attempt to do too much at once, but it would as certainly be wise for all towns interested to begin at once to do. I think our cities are already under good headway in a proper direction, and it is plain to see that their work is now having a wholesome influence upon many of the country towns. This is especially noticeable in Bristol, Barrington, East Providence, South Kingstown, Lincoln, Cumberland and Johnstown, and probably in some others. And with the manifest appreciation sure to follow and inure to the profit of towns making highway improvements, we may have good hope, I think, that all our towns will soon be following *en suite*. I well remember making a passage in the spring of 1847 on shipboard, from Charleston to New York, and having for fellow passengers a company of English dramatists, who had been making a tour of the states. Of course acquaintance soon developed at sea, and to my declaration that I was from Providence, they said to me: "Well, you have the *best bit of road* (it was the old pike), from Providence to Pawtucket, that we have seen in America." I need not say that I felt complimented in my city by this bit of disinterested testimony, and have never forgotten it, and to-day I have no doubt but that "bit of road" had as much to do as any one factor in developing the prosperity of the two cities. And now let me

hope, if I shall ever again chance to make another sea voyage with European travelers, and announce myself as from Rhode Island, that they may say—and truthfully—you *have the best roads in the states* ; but to warrant this we must make *improvements*.
Let us at it.

WHO SHOULD BUILD THE COUNTRY ROADS ?

By Hon. Clem Studebaker, of Indiana.

BY whom shall country roads be built? To intelligently answer this question we should know who are benefited by the roads. To generalize, I would, for the purposes of this article, divide these into two classes, individual and governmental, and these again into two sections each, the first into inhabitants residing in the country

and those whose homes are in the city; and the second into state and national. Let us consider them separately.

1. The individual living on the line of the highway. He needs a thoroughfare by which to carry his produce to market; by which to visit places where the necessary supplies for his household and farm can be obtained; and by which he can send his children to school and carry his family to church, to the railway station, or on other trips required by necessity, convenience or pleasure.

2. Country roads are important to the townsman. Without them the merchant could not supply his city customers with the



HON. CLEM STUDEBAKER.

butter, milk, eggs, vegetables, etc., received from the farm, or those products which he buys for shipment to other markets, nor could he count on the farmer as a customer for groceries, dry-goods, boots and shoes, and other necessities and comforts of life. The merchant, the banker, the manufacturer, the lawyer, the doctor, and more or less directly everybody in the towns, is interested in country roads. In passing, I may say that enterprising merchants in many places have been so fully alive to their interests as to secure the building of country roads, at the expense of their respective towns, often for several miles into portions of agricultural districts from which, under the influence of good roads, they might naturally expect a large demand for their goods. Every town, indeed, is largely dependent for its prosperity upon the trade which it derives from the surrounding country, especially if it is not a manufacturing town, and there can be no doubt that it would be money well expended for towns to aid liberally in building fine country roads, which would serve as feeders to these centres of population.

3. The national government is greatly interested in country roads. There are great numbers of small towns throughout the country, which must still receive the United States mail over country roads. Not only this, but civil officers of the national government, in the discharge of their duties, must use the public highways from one end of the land to the other. And still further, in case of insurrection or rebellion, requiring the intervention of government troops;—in such case good country roads become of the utmost importance. If there had been a government road like the old national post road, leading from Fortress Monroe through Yorktown and Williamsburg, to Richmond, McClellan might have ended the war in the spring of 1862. As it was, his army had not only to struggle against a gallant opposing force in its advance on the Confederate capital, but to contend as well, foot, horse and artillery, for every rod of the way through unfathomable mud. Miles of log roads had to be built before cannon or wagons or artillery could be brought up, and progress under such circumstances sapped the strength, energies and courage of officers and men. Stuck in the red Virginia clay, while pulling one foot out they got the other in, and thousands of lives were lost and precious time consumed through making efforts practically as futile as those made by flies rooted to adhesive fly-paper. If the country roads of the South from point to point had been solid and smooth, the shock of arms

would not have been less terrible while it lasted, but the result would have been less prolonged, and in the aggregate the loss of life and sacrifice of treasure would have been but a tithe of that which was so lavishly and unhappily poured out. Heaven grant that the last need of good roads may be their use by national troops for engagement in fratricidal strife. But facilities for extinguishing a fire do not invite the flames, and reasonable precautions wherever exercised are the part of wisdom.

4. The states themselves, in the main, for reasons already mentioned as applicable to the United States, as an affirmation of their interest in good roads, are parties concerned. The civil officers of the state are constantly traversing the highways, and in case of need of the militia to assist the state constabulary in preserving order, the condition of the roads of the state may be a matter of great consequence.

To summarize, I have tried to show that not only are we interested directly or more or less remotely as individuals, whether living in country or town, in this subject, but also that the state and nation have a natural concern, and resultant responsibility for constructing and maintaining country highways. Now I come with some sort of preparation for answering the inquiry, who shall build these roads? Obviously if all have some part in the benefits, none should be exempt from leading a hand in the work. And I maintain that in the construction and repair of these highways, the nation, the state, the town and the country should share equitably in the assumption of the burden. Henry Clay, as brilliant and patriotic a statesman as the country has known since the days of the founders of the republic, successfully defended the doctrine of internal improvements on the part of the nation, and of roadmaking in particular. In a notable speech on the subject, March 13, 1819, after laying down the principle that congress had the power to build roads and canals, Mr. Clay said :

“The aggregate benefit to the whole society from a public improvement may be such as to amply justify the investment of capital in its execution, and yet that benefit may be so distributed among the different and distant persons that they never can be got to act in concert. * * * * Those who would be most benefited by these improvements may reside at a considerable distance from the sites of them; many of those persons never have seen and never will see them. How is it possible to regulate the contributions, or present to individuals so situated a sufficiently lively picture of their real interests to get them to make exertions in effectuating the object commensurate with their respective abilities? I think it very possible that

the capitalist who should invest his money in one of these objects might not be reimbursed 3 per centum annually upon it; and yet society in various forms might actually reap 15 or 20 per cent. The benefit resulting from a turnpike road made by private association is divided between the capitalist who receives his tolls, the land through which it passes, and which is augmented in value, and the commodities whose value is enhanced by diminishing expense of transportation. A combination upon any terms, much less a just combination, of all those interests to effect the improvement is impracticable. If you await the arrival of a period when the tolls alone can produce a competent dividend, it is evident that you will have to suspend its execution long after the general interests of society would have authorized it."

The national government in the pursuance of this policy did build a national road from Cumberland, on the Potomac, in Maryland, through the states of Ohio, Indiana, Illinois, terminating at Jefferson, Mo. The road was finally ceded by the government to the different states through and into which it took its course. Mr. Clay, however, regretted this step, believing it to be the duty of the government, in the interests of the whole people, to maintain supervision of the line, and keep it in good condition. But the construction of great railway arteries from the east to the west and from the north to the south engaged the public attention, to the neglect of the humbler but no less important thoroughfares constituting the veins and capillaries of our system of intercommunication. This was a great mistake. The railways have been mightily instrumental in opening the country to settlement, and their swift moving trains carry the burden of a gigantic commerce; but as well might the deep flowing river expect to keep its banks full without the springs and creeks which empty into it, as for railways to prosper without the aid of country roads. Every intelligent manager of a railway system is friendly to good country roads, and it is stated that the Pennsylvania line, and other railways, have offered to transport material for the improvement of wagon roads leading to their stations free of charge. We want the railroads, but not less surely we want wagon and carriage roads, which shall traverse the country in every direction, connecting the towns and intersecting the railways like a vast interlacing network of communication. It is true that these avenues are in a certain sense already open; it is not less true that in the majority of cases the condition of these highways is such that their use is available at all times under disadvantages, and for some months or weeks of the year, practically not at all. Sometimes the disqualification is sand, again it is steep grades; more often it is a road-bed, deep, soft and sticky with mud.

The wagon and carriage road system of the United States ought to be under the direction, supervision and control of the War Department of the national government. The officers of the army are peculiarly well fitted to take charge of this great and important work. Their West Point studies have given them a thorough knowledge of the theory of civil engineering, and many of them have had practical experience in road making, in the establishment of grades, in ditch digging, the construction of embankments, and bridge and culvert building, etc. In these piping times of peace, moreover, they have the leisure for this work. They are practically "out of a job," and hundreds of them would hail the charge of this work as a welcome relief from the tedium and listlessness of post duty or camp life. But further, they are not only especially qualified for the work, and have the time to do it, in their hands this branch of operations would be removed from the danger of being harnessed to some political machine. I am aware that such a scheme for national road making as I am suggesting would be stubbornly opposed by many who would otherwise favor it, unless it could be securely divorced from the possibility of use to further the ends of any political party.

There is another phase of this proposed plan that to my mind is enormously in its favor. It is that which contemplates, in the prosecution of the work, the employment by the general government of a more or less large body of common laborers. On what precise terms these men could be most wisely engaged for their own good is really an after consideration. It might be thought best to enlist them for a term of years—two, three or five; furnishing them with clothing, rations and pay as is now done in the case of the soldiers. There is a numerous class in this country whose enlistment as road makers, under an engagement which would insure to them a frugal living, clothing, shelter, and care when sick, would be a boon indeed. Political economists will never make headway against the growing spirit of socialism until, through the establishment of some permanent agency for the employment of surplus labor they can say to every man who demands bread, "obey the divine mandate, 'by the sweat of thy brow, shalt thou eat bread,' and here is your free and unquestioned opportunity to earn and receive it." Our country grows more prosperous year by year. The accumulations of riches are piling higher and higher. Invention has harnessed to production the dumb but mighty forces of nature to make man's lot less

toilsome and hazardous. Yet still is heard the cry of want, and men walk the streets of our great cities and roam the country lanes, ragged and hungry, self-respect and moral principle influences of the past, a menace to the peace and order of society. The optimist may lightly laugh over the gravity of the situation, and insist that there is no danger; but if he has sense, his whistling simply signifies that he is trying to conceal his uneasiness. The signs of the times bode mischief, and the clouds of the future are muttering and sinister.

Who shall come to the rescue? The manufacturer, the capitalist, the churches, organized charities? These instrumentalities, each in its particular sphere, directly or indirectly aid in the work of improving the common lot of humanity; but they are powerless to adequately reduce any given congestion in the ranks of the unemployed which the fluctuating condition of the labor market may precipitate upon the country with but a moment's warning. For my part, no outcry against "paternalism" can shake my belief that it is a proper and expedient function of the general government to see that no man within the border of the nation, of whose affairs it has oversight and management, shall be able to say, "I beg (or I starve, or I steal) because I have no work by which to earn bread." This is not an encouragement of a spirit of dependence or pauperism. It is a move to banish idleness, to discredit beggary, to make thievery more odious, and on the other hand to promote industry, sobriety, comfort and virtue. Christ said to his disciples, "The poor you have always with you." We will always have an improvident class; but it is a cynical and unfeeling philosophy that has no concern for the pangs of the hungry, excusing its callousness on the ground that the gnawings of an empty stomach are a stimulus to labor. If we have hearts of flesh and blood instead of stone, the misfortunes of the poor will touch our sensibilities, whether these have seemed to be self-invited or unavoidable.

Then, I would have our government control our wagon and carriage road system for a two-fold object: Primarily, to give to the country roads scientifically and durably built, which should be of incalculable value to the whole country in improving and cheapening communication between the farm and the market; and, secondarily, to furnish a safety-valve to the labor market, giving ready employment to the men most in need of help the moment they are thrown out of work, the unskilled class. I would not be understood as proposing that the national govern-

ments should assume the entire burden of expense of the building, improvement and care of the wagon roads of the country. In France and other foreign countries, where wagon roads are maintained at a high state of perfection, the expense of the roads is shared by the general government, by the state government, by the country, and by the individual whose property is adjacent to the roadways. The plan is commonly for the national government to maintain roads connecting the capitals, or those which are interstate in character ; the state builds and keeps up state roads, and the smaller subdivisions of country bear the expense of the intersecting by-roads and lanes. Some equitable distribution of the expense of this nature could be adopted by us. The burden ought not to be borne as now mainly by those whose property is immediately adjacent to the roadway. The benefits of good roads are almost wholly indirect in their realization. If the roads are bad, not only the farmer, but everybody else feels the languishing effect which business experiences therefrom. The benefits are largely general ; the expense should be more largely paid from the general fund.

In making my plea for good roads, I desire to emphasize my conviction that our need is for enduring roads. My study of this subject leads me to the conclusion that four-fifths of the outlay put upon our roads at the present day is ephemeral in character. The plowing, the harrowing, the leveling, the ditching and smoothing of the annual road tinkering is quickly wasted when the next protracted rain visits the locality. The late Governor Hovey, in his last message to the legislature of Indiana, estimated that between two and three millions of dollars in money and labor had been expended upon the roads of the state during the year ending October, 1890. The amount was sufficient to build six or seven hundred miles of substantial macadam roads, of a nature to last, with light repairs, a hundred years. Instead of such an enduring improvement to show for this great outlay, for the most part the work done was more appropriate for the preparation of an onion bed. It would be better for a country to build five miles of good macadam road each year, and let the remainder of the roads alone, than to continue the course usually followed.

Here is a vast interest, one of the most important of those affecting the welfare of the nation, and instead of treating it intelligently, and adopting the best working models, plans and specifications for advancing it, we pursue haphazard, insufficient,

and often densely ignorant methods, without design or apparent purpose, except to work out our tax, or spend the money collected for the purpose with as little delay as possible. Road building is an art, and although the ancients were masters of it, and constructed highways which have lasted for twenty centuries, an under estimate of the value of good roads has so generally obtained with us, that our western world, ambitious to be thought the highest exponent of advanced civilization, is still content with roads that to Europeans seem a burlesque on the name.

HORSE TALK.

Don't ask me to "back" with blinds on. I am afraid to.

Don't lend me to some blockhead that has less sense than I have.

Don't think because I am a horse that iron weeds and briers won't hurt my hay.

Don't be so careless of my harness as to find a great sore on me before you attend to it.

Don't run me down a steep hill, for if anything should give way I might break your neck.

Don't think because I go free under the whip I don't get tired. You would move up if under the whip.

Don't put on my blind bridle so that it irritates my eyes, or so leave my forelock that it will be in my eyes.

Don't whip me when I get frightened along the road, or I will expect it next time and may be make trouble.

Don't hitch me to an iron post or railing when the mercury is below freezing. I need the skin on my tongue.

Don't keep my stable very dark, for when I go out into the light my eyes are injured, especially if snow be on the ground.

Don't leave me hitched in my stall at night with a big cob right where I must lie down. I am tired, and can't select a smooth place.

Don't forget to file my teeth when they get jagged, as I cannot chew my food. When I get lean it is a sign my teeth need filing.

Don't say whoa ! unless you mean it Teach me to stop at the word. It may check me if the lines break and save a run-away and smash-up.—*Courier Journal*.

DIRT ROADS AND GRAVEL ROADS.

A PLAIN LETTER ON A PRACTICAL SUBJECT.

By Isaac B. Potter.

III.

MAKING THE ROAD—NEED OF PLANS—GOING OVER THE LINE—
MATERIALS NEEDED—IMPORTANCE OF DRAINAGE—SIDE DITCHES
GENERALLY INSUFFICIENT—HOW SHOULD A DIRT ROAD BE
DRAINED—CENTRE DRAINS AND SIDE DRAINS—TILING RECOM-
MENDED.



SCENE SHOWING ORDINARY CONDITION OF DIRT ROADS IN THE UNITED STATES IN SPRING AND FALL, AND ILLUSTRATING THE INSUFFICIENCY OF SIDE DITCHING FOR THOROUGH DRAINAGE. FROM PHOTOGRAPH.



SSUMING, now, that you have settled the question of location, and that you have staked out the centre line of your proposed road from end to end, we may give our attention to the plans for construction work.

You must be systematic about this, for system will insure economy, exactness and facility, and will enable you to do your

work thoroughly and with satisfaction. To insure system in the work of construction you must have plans, and while these plans need not be elaborate, nor made by an engineer, they must be plainly arranged and drawn to suit the various methods of work which may be found necessary at different points along the line of your road. They should, moreover, be made to include all details, showing cross sections and dimensions of the roadway at different points, and of the ditches and drains ; and the kinds of materials to be used should be plainly indicated on these plans as well as approximate quantities of each. Separate plans will be needed for culverts and bridges, unless they be of the most simple description, in which case a written memorandum of quantities and brief reference to the kind of work to be done may be sufficient. Before going about the preparation of these plans you had better walk over the line of your road in wet weather. Select a day immediately following a heavy rainstorm for this trip, and as you go along the route, take note of the streams and brooks, the direction of their channels, and the volume of water which they severally carry. Notice also the smaller streams which run close to your line, for many of these become conspicuous only in the rainy season, and you may now make note of their location and direction. Examine the soil at different points along the line, and do this with special view of noting its tendency to hold water or to drain it ; in other words, find out whether the dirt is compact, and of a clayey nature, and therefore likely to hold water, or of a gravelly and porous kind, through which the water will quickly run. Examine also the neighboring country along the line, and learn as fully as possible where stone and gravel can be cheaply obtained, to aid you in draining your dirt road wherever the use of stone and gravel may be necessary. Stone for culverts and timber for bridges must also be provided for in most cases, and other points must be looked after, which your experience will suggest as you go along.

Having done all this, and having made necessary notes of the facts learned by your examination of the ground, you are ready to make your plans, and, as I have before said, these may be roughly drawn ; but they should be exact and plain in every detail, so that a stranger may easily understand them. If the line of your road is of somewhat extended length, you will probably find a variety of conditions, all of which must be studied and taken into account in the actual work of making the road.

For example, in some places your line will run across open fields where the ground is practically level and the soil easily worked and handled, while at other points your course will wind around steep slopes of side hills and perhaps rocky bluffs, where the work of construction will be found more difficult, and its accomplishment only to be attained by considerable expense and by the employment of skilled labor. But whatever may be the conditions, there is one object to be kept constantly in view, and it may be laid down as an unfailing rule that to neglect this object, or to disregard its importance in construction work, will generally lead to inferior results and frequently to disaster. I refer now to drainage.

Drainage.—Water is the great destroyer of dirt roads and, indeed, of many highways of more pretentious character. If you assume that your highway will be only sixteen feet wide when completed, you may begin your work with the fact in mind that on each mile of this road there will fall every year an average of nearly 9,000 tons of water. This water has no proper place in your road, and should be carried away from and out of it as fast as it falls. In cold weather it freezes, forming frost and ice, which heave and swell the soil of the roadway and dislodge and throw down the masonry of your walls, culverts and bridges. In spring and summer it softens the dirt and turns the line of your dirt road into an impassable slough, destroying the effect of your work and rendering it practically useless as a public highway.

And drainage is specially important in the proper making and keeping of a dirt road, because the material of the roadway is more susceptible to the action of water and more easily destroyed than all the highway materials used in the construction of roads by more elaborate methods. In view of this fact it is not a little singular that so little provision is made for drainage of ordinary roads, which are almost uniformly of dirt in our country districts and in many of our most important villages.

Look at the picture on page 187 from a photograph taken on one of the most important roads in the United States, and you will be reminded of a familiar sight which may be found upon any of our country roads during several weeks in spring and fall. Side ditches are provided in most cases; but common experience shows how imperfectly these are made, and how inadequate even the best side drains are to relieve the road from

its soggy, impassable condition. Nothing brings relief except the slow process of evaporation, and even when the road is made dry by the sun and wind, it is generally left in a rough, rutty condition, which makes travel difficult and costly. Here is a picture taken within the boundaries of a thriving Connecticut village, which shows the deep ruts of an ordinary dirt road after the deep mud had dried and travel has begun to resume its course. It is another familiar picture, and emphasizes what I am now urging against the insufficiency of ordinary methods employed to drain our dirt roads.



STREET SCENE IN A CONNECTICUT VILLAGE (FROM PHOTOGRAPH); SHOWING DEEP RUTS IN DIRT ROADWAY, CAUSED BY BAD DRAINAGE AND NARROW WHEEL TIRES.

I believe I run no risk in asserting that there are counties within many of our wealthier states which might afford to spend a million of dollars to insure a thorough drainage of its country roads, and find the outlay a profitable investment.

How Should a Dirt Road be Drained?—A volume might be written upon this question alone, for, more than any other, it affects the maintenance of the thousands of miles of dirt roads now in constant use, besides being an important consideration in the construction of new roads. When water falls upon a dirt road we aim to carry it off in either of two

ways: (1) By surface drainage, which is generally sought to be effected by giving the surface of the road a slope to one side or to both, as the case may be, with intent to turn the water into the side ditches, or (2) by under-drainage, in which the water failing to escape by running from the surface to the side ditches, is drawn into a permanent drain, generally laid lengthwise with the roadway and beneath it, and so made as to carry the water to some adjacent outlet. What are the relative values of these two methods of draining? Let us consider them separately.

Most dirt roads have an obstinate tendency to hold water. They seem to include in their composition more or less of a viscous, sticky, tenacious substance which, when wet, lays hold of every solid material that is brought in contact with it, and forms an obstacle to the free passage of water. You may scrape one of these roads into the form of a nicely graded surface and roll it as hard as you please, only to find that the softening influences of the first rainstorm will permit the wagon tires of the first loaded wagon which passes over it to make more or less of a depression, or miniature gutter, in its surface. This gutter or depression serves to hold the water which falls upon the roadway, and in this manner the bottom of the depression is softened and made more susceptible when the next wagon wheel comes along, and so the depression is deepened into an actual rut. From the minute when the first small gutter is formed by the passing vehicle over the wet roadway surface, the sides of this gutter form barriers which prevent the draining of water into the side ditches, and this evil effect is made greater by the continued passing of vehicles and by the continuation of the storm. You and I have both seen this effect so many times that I need only mention it to recall to your mind its familiar occurrence in all parts of the world where we travel over the common dirt roads.

I am a strong advocate of the use of road machines, and believe also in the thorough rolling and grading of the road surface; but I am compelled to say that I have never yet seen a dirt road (and I am speaking now of dirt roads as distinct from roads of a coarse, gravelly nature) which offered a permanent and sufficient drainage by side ditches during the wet seasons of the year.

These ditches are often carelessly graded, and always carelessly kept; being generally left to clear themselves, and so neglected that they become obstructed by washings from the

road surface, and in this and various other ways their capacity, which was poor enough at the outset, becomes wholly destroyed. Here is a picture which serves to show a case exactly in point. You see the roadway shown in this picture has not only become



DIRT ROAD IN VILLAGE, SHOWING DEEP MUD IN ROADWAY AND NEGLECTED SIDE DITCHES. FROM PHOTOGRAPH.

a genuine quagmire, but the water stands in great pools in the shallow, neglected side ditches, as if to prove their worse than worthless condition. The material of the roadway as well as that which clogs the ditch tends to obstruct the passage of water rather than to hasten it.

Nor, except in rare cases, are side drains sufficient, even when kept open and clear of obstructions. They are useful to catch and carry off the running water which floods the surface of the road in times of heavy rainfall; they receive much of the water which comes from melting snow and ice, and from adjacent side hills, which often descend toward the line of the roadway, and to answer these conditions of usefulness they should be provided; but are in no sense to be recommended as a sufficient means of draining water from the mud which forms in every dirt wagon-way, and to this fact ten thousand miles of side ditches lend proof to-day in all parts of our country. Water weighs about 62 pounds per cubic foot, and when it comes down in the form of pelting rain your dirt roadway quickly absorbs it, and gravity tends to draw it, not sidewise, but directly downward into the body of the roadway. If the water comes down faster than the dirt can absorb it the surplus runs off in the line of the nearest channel, and perhaps to the side drains; but the absorption goes on just the same, and in the end the roadway becomes soft and soggy, and you know from your own every-day observation that to relieve the road from this condition your side drains are practically useless. I am going to introduce here another picture which serves to illustrate this point with much force.



SCENE SHOWING DEEP MUD IN DIRT ROADWAY AND ILLUSTRATING THE INSUFFICIENCY OF SIDE DRAINAGE. FROM PHOTOGRAPH.

Here you see a narrow dirt roadway raised several feet above the surface of the ground on either side. The top of the road has been fairly graded toward the side slopes of the bank, and, except for the absorbent qualities of the dirt the water might easily have been carried off from the roadway surface. It is a familiar scene, isn't it?—a simple every-day, everywhere occurring case of a soaked roadway. I am going to suggest a way out of this difficulty. It is a way that has stood the test of experience; and it has a value which no power in the range of mathematics will enable you to compute. It will cost you nothing to consider it, and only a trifle of expense to give it a practical trial. It is this:

Every dirt road should have a centre drain. Water is a heavy, limpid substance, forever tending downwards and seeking its lowest level. Fill an ordinary flower-pot two-thirds full common earth, and cover this earth by pouring in two or three inches of water, and take note of the short time required for this water to pass through the earth and find its way out at the bottom of the pot. In a few hours, at the most, the earth in your flower-pot will again be as dry as before. This is simply an illustration of the effect of good drainage. It is direct and therefore rapid. It invites the flow of the water in the direction in

which it naturally tends to run. It provides for the water, a way out; it is centre drainage,—the kind that I am recommending for your dirt road. If now you will stop the hole in your flower-pot by means of an ordinary bottle cork, and again pour upon the dirt a sufficient quantity of water; you will soon find your flower-pot to be filled with common every-day mud, in no way unlike that through which your horses will wade this spring while on their weary way to market. Withdraw the cork and again the dirt in the pot begins to free itself from the water and in a few hours is again in a tolerably dry condition.

Now, in making plans for draining your dirt road, bear these facts in mind, and unless the soil is of that hard, coarse gravelly kind that packs easily and quickly drains itself (a rare combination of conditions) you had better provide a way by which the water (which will surely get into your roadway) may find its way out;—in other words, make plans for centre drainage,—for you will find in the end that centre drainage is the surest, the quickest and the best means of draining the wagon-way of a



FIGURE 1.—SHOWING CROSS SECTION OF DIRT ROAD WITH SINGLE TILE DRAIN IN CENTRE.

common dirt road. If your material is of a heavy clay, and indeed in any case where a porous soil is not found in the line of the roadway, some provision should, if possible, be made for filling the centre drain ditch with a suitable substance through which the water may be carried to the channel of the drain below. Fix the line of grade for your drain at a convenient distance below the surface of your roadway, and give it a gradual and sufficient slope so as to carry the water lengthwise with the direction of the road to some neighboring culvert; or, if no culvert be convenient, into a cross pipe drain, so as to empty the water upon either side of the road as may be found practicable and convenient. Give your centre drain ditch broad, flaring sides, as shown in figure 1, so that the water may be carried down into the drain from the full width of the wagon track, and if the roadway is made very wide, it will insure better construction and better economy and satisfaction in the long run, if you double your line of drain, as shown in figure 2.

Do not forget that the object of your centre drain is to receive water which passes directly downward through the earth of the roadway, and let your plans show the material in these trenches to be of as gritty and porous a nature as can be found conveniently at hand. You will, of course, provide for an open water-way at the bottom of your drain, which may be of tiling, bricks, flat stones or fascines, but above this water-way, whatever its form may be, there should be placed, if possible, a plentiful supply of common field stones, reserving the smaller ones for the upper layers and finishing the whole to conform to the cross-section surface of your road. If gravel is not obtainable, you may be compelled to use such earth material as you find in and near the line of the roadway; but if this material is not of a kind through which water will pass quickly; in other words, if it is of a fine clay or loamy nature and likely to form thick dust in dry weather and deep mud in the rainy season you can only prevent its working down into the stone covering of your drain by interposing some kind of a layer between the stones and the



FIGURE 2.—SHOWING CROSS SECTION OF DIRT ROAD WITH DOUBLE TILE DRAIN.

earth top. For this purpose, after first arranging the stone filling of the drain so as to form a tolerably level surface at the top, you may put on a layer of coarse marsh grass, straw or hay, and after this, the earth top of your road. In this connection I had better tell you also that in opening your trench for centre drainage, if you find the soil soft and likely to yield or become mixed with the stone filling (which will press heavily on the flat sides of the trench) you may, before filling the trench, cover its sides with coarse marsh grass or fine brush to prevent the settling of the stones and then by your plans show the stone or gravel to be laid on this covering.

Assuming that your ditch has been properly opened and graded for one or more lines of centre drains we now come to the question: What kind of drain shall we use? The ordinary drain tile, used in farm drainage will be found to answer an excellent purpose and should be used wherever the question of expense will permit; but if these are not available, irregular or rounded field stones may be used, or fascines may be laid along the bottom, as shown in the separate figures 3, 4 and 5; but whether

you employ tiles, stones, bricks or fascines, you should see that they are carefully laid at the bottom of your trench throughout its entire length, in such manner as to insure the free passage of water without danger of clogging. In the same manner filled drains may be made to answer the purpose of side ditching where (as frequently occurs) open ditches are more or less dangerous to travelers and vehicles.

There is another form of covered drain which I have seen recommended by good writers, and which may well be mentioned here, and perhaps commended on the score of cheapness in point

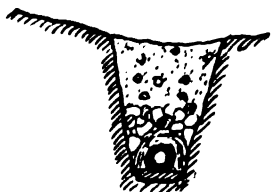


FIG. 3.—SHOWING TILE DRAIN.



FIG. 4.—SHOWING FIELD STONE DRAIN.



FIG. 5.—SHOWING DRAIN OF FASCINES.

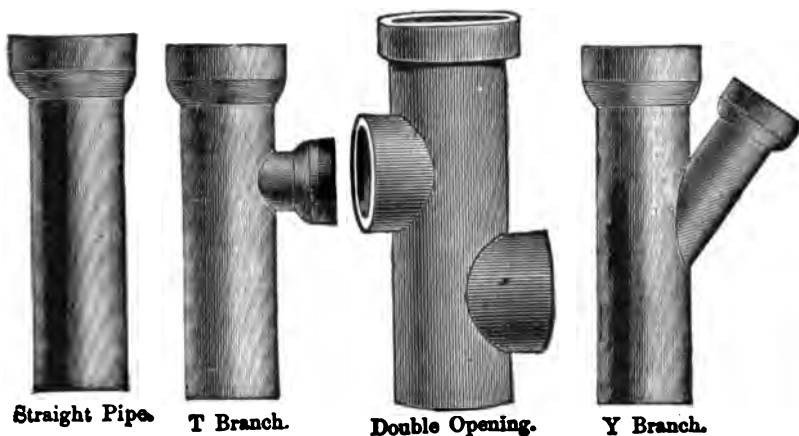
of first cost. It is made by laying short strips of wood a few feet apart and crosswise, from side to side, in the bottom of the ditch, and placing upon these an inverted or roof-shaped gutter composed of two narrow planks or boards nailed together at their upper edges; and containing auger holes through which water may be admitted to the channel of the drain. Such an arrangement is, of course, more perishable than a drain of tile or stone; but where the latter cannot be provided it may be used as an effective substitute.

IV.

CULVERTS—VITRIFIED PIPE RECOMMENDED—DESCRIPTION AND VARIETIES—ABUTMENTS—HINTS FOR PLANNING—BRANCHES TO RECEIVE CENTRE DRAINS—STONE CULVERTS—WOODEN CROSS DRAINS—COST OF MATERIALS—TRACING OF PLANS.

Culverts.—In making your plans you may insure the quality of your work, and at the same time greatly reduce the expense of construction, by providing for the use of pipe culverts, in which the main channel of the culvert is made up of one or more lines of vitrified or earthenware pipe. This pipe is made in great variety of forms and sizes, and experience shows it to be admirably

suited to the use of highway culverts. Besides being cheaper than culverts being built wholly of stone or brick, it presents a smoother interior surface and a contracted channel at the bottom, formed by the curve of the pipe, which insures the more rapid



FIGURES SHOWING COMMON FORMS OF VITRIFIED DRAIN OR CULVERT PIPE.

flow of water, enabling the pipe to clear itself by a scouring of the stream on the inner surface. If properly made it is very strong and will resist any reasonable pressure, a 24-inch pipe having being shown by actual test to withstand a pressure of over 25,000 pounds applied on the outer surface, while the smaller sizes will sustain a greater pressure, as was shown in the case of a 6-inch pipe, which sustained a pressure of 40,000 pounds.

Abutments.—In planning pipe culverts you will, in many cases find it necessary to provide a face wall, or abutment, at each end of the pipe. Sometimes a very cheap substitute for masonry is



SPECIAL FORMS OF VITRIFIED PIPE.

made by driving a couple of timbers about six inches square, with sharpened ends, well down into the soil on each side of the pipe, and giving the two timbers a slope corresponding with the slope of the bank against which they rest. Then planks are laid across the face of the timbers, a hole corresponding to the size of the pipe being cut in the planks, which fit around the pipe and support and protect its ends. A more substantial and more



FIG. 6.—SHOWING MASONRY ABUTMENT AND PIPE CULVERT UNDER DIRT ROADWAY.

satisfactory way is to build a masonry wall of stone or brick, as shown in figure 6, into which the pipe is firmly cemented. In making plans for this abutment, you should have it carried far enough below the surface of the ground to prevent it being raised or heaved by the frost, which would have the effect of

disjointing the pipe and throwing it out of position. In figures 7 and 8 I have introduced small sectional diagrams showing how these abutments can be built. The vitrified pipe is made in lengths

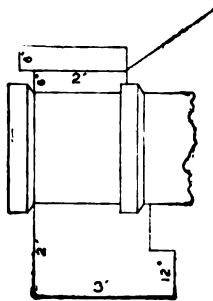


FIG. 7.—SHOWING FORM AND DIMENSIONS OF ABUTMENT FOR PIPE CULVERT; INLET OR UPSTREAM END.

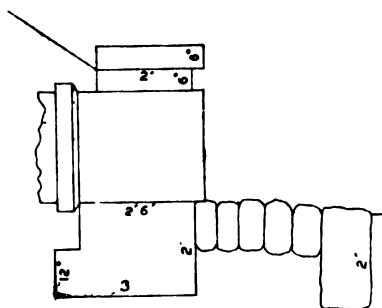


FIG. 8.—SHOWING FORM AND DIMENSIONS OF ABUTMENT FOR PIPE CULVERT; OUTLET OR DOWN STREAM END.

running from two feet to thirty inches, and from a somewhat extended experience in the use of this kind of pipe for drainage purposes, I have no hesitation in recommending it as the cheapest as well as the best means employed for cross drains and culverts in the construction of dirt roads. Besides the ordinary forms of straight pipes with the common socket joints, as shown in the figures, some of our manufacturers have introduced a form of pipe with grooves or channels running around the inside surface

of the bell or socket end and corresponding grooves formed upon the plain or socket end of the pipe, the intent being to insure by these roughened surfaces a stronger adhesion of the cement or clay, which is used in making tight the connections between the different pipes. This idea seems to be well conceived and is



highly recommended by many practical men who have tested its value, though for ordinary purposes the plain pipe will answer every requirement. Another novelty has been introduced in the form of an oval or egg-shaped pipe, in which the cross section has the longer outline form of an egg, the intent being to lay this pipe

upon its narrowest edge, thus still further contracting the width and increasing the depth of the waterway and producing a corresponding increase in the velocity of the flow. For sewers, and in situations where it is found necessary to adopt a flat or slight grade, this form of oval pipe offers advantages worth considering; but for short culverts running the width of the roadway, they seem to offer no practical advantage over the ordinary round pipe, while the latter, indeed, may sometimes be preferred, especially in cases where the depth of earth covering is slight.

In providing plans for pipe culverts, especially in cases where centre drainage is to be included in your plans, you must remember to put in a branch pipe at the centre of your culvert, with the branch so placed that water from your centre drains will flow into the culverts from both directions, and if the culvert be long, extending beyond the side lines of your roadway, as it commonly will; you should provide also branches into which the water will empty from your side drains or side ditches.

While referring to vitrified pipe, it is important to say that there are two kinds of this pipe, made by two widely different processes and varying in quality in a very important degree. The cheaper kind is the "slip glazed," so called because before being hard burned it is dipped into a clayey solution, which melts at a low temperature, and then the pipe is set in a close kiln and heat supplied in a sufficient degree to melt the outside covering and cause it to run over the pipe. This glaze or cover-

ing is likely to be affected by frosts and acids, and it sometimes happens that through the insufficient burning of slip-glazed pipe, it becomes soft and spongy after being put in the ground.

It is better, therefore, to use always the "salt-glazed" pipe, and most engineers prescribe the use of this pipe where strength and durability are required. This is made of a good quality of clay (necessarily), and after the pipe is formed and dried it is placed in a close kiln and gradually subjected to an intense heat. During the application of this heat, coarse salt is thrown upon the fire in small quantities and the vapor of the salt, combining with the silica in the clay, produces a permanent glaze, which is really a part of the body of the pipe. To endure the great heat required to vaporize the salt a good quality of clay is needed and this fact, beside the permanent character of the glazing, should impel you to prefer salt-glazed pipe wherever vitrified pipe is to be used.

Stone Culverts.—In spite of my recommendation of pipe culverts, local considerations may impel you to adopt the use of stone for this purpose, and if your stone is of good quality you may do this with excellent results, though the cost will always be greater. Rough rubble masonry will answer every purpose in the culverts of ordinary dirt roads, and I need only urge you to provide ample waterway or opening in each culvert, remembering that it is much better to give too much space for the passage of water than too little, and to give your walls plenty of strong cement mortar and lay your stonework with plenty of "headers" providing a strong bond with heavy stones at the angles of the openings and on the up stream end of your culvert, especially if it is likely to be subjected to contact with floating ice in the season of spring freshets.

The bottom of the opening should be paved with stones of suitable shape set on edge and given a downward curve in the centre somewhat after the manner of an inverted arch.

In figure 9 I have shown you an end view of a stone culvert which will afford you a tolerable guide in planning this sort of work; but no complete dimensions can be given here that will answer in all cases, and your common judgment and experience, and perhaps the advice of a competent engineer or experienced mason will serve you in special cases. As directed in the case of pipe culverts, it will be necessary, if centre drains are used, to provide pipe openings through the walls of the culverts wherever the centre drains are designed to empty into the culvert.

Of course it is always important to give ample size to your culvert pipe and to do this you should inform yourself of the greatest flow of water which the pipe will be required to carry. If you have any knowledge of the area of the "water-shed" (or land from which water will flow toward and through your culvert) you may make calculation as follows: One inch rainfall per hour gives, in round numbers, 23,000 gallons of water for each acre, or 377 gallons per minute per acre. Much of this water, however, will be retarded by various obstructions and not more than about 70 per cent. will reach your culvert within the same hour. Now suppose your culvert is to receive the water drained from 1,000 acres. Then the water falling upon this area in the heaviest rain-storm will be 377,000 gallons per minute, and to provide for its passage through the culvert you must take into account the condition of the area to be drained, whether it is made up of steep side hills and rocky slopes from which water will rapidly run, or whether it be largely composed of flat lands, gentle slopes and porous soils, over which the water will slowly fall and into which it will become largely absorbed.

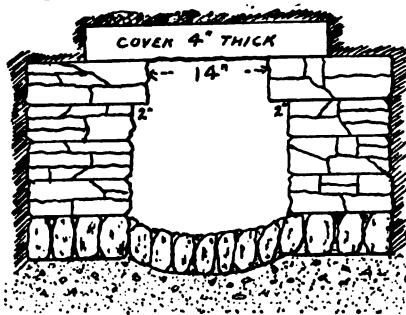


FIG. 9. SHOWING END VIEW OF ORDINARY STONE CULVERT.

By referring to the table on 203 page you will find the carrying capacity in gallons per minute of the different sizes of pipe drains, and this table will aid you in providing the proper size of pipe for your culverts. If the height of your road surface is but a short distance above the culvert stream, and you are thus prevented from using as large a pipe as you would otherwise select, you may avoid this difficulty by laying two or three lines of pipe side by side to serve as water-ways for your culverts, building them into the abutments at each end, as already described in the case of the single pipe.

By referring to the table on 203 page you will find the carrying capacity in gallons per minute of the different sizes of pipe drains, and this table will aid you in providing the proper size of pipe for your culverts. If the height of your road surface is but a short distance above the culvert stream, and you are thus prevented from using as large a pipe as you would otherwise select, you may avoid this difficulty by laying two or three lines of pipe side by side to serve as water-ways for your culverts, building them into the abutments at each end, as already described in the case of the single pipe.

Wooden Culverts.—It sometimes happens that circumstances will forbid the use of either stone or pipe, and in districts where timber is plenty wood culverts may be provided. Figure 10 shows a shallow cross drain made of timbers flattened on the sides and resting on three-inch planks and covered with strips of same thickness. Such a cross drain will answer for small streams,

and the figure will serve to show the general plan upon which these culverts are made in some important locations. As the sides are deepened by the addition of more timbers, it will be necessary that the timbers be strongly spiked or bolted together,

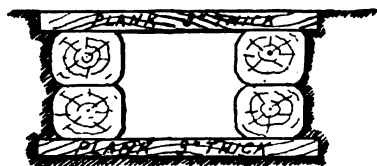


FIG. 10. WOODEN CROSS DRAIN OR CULVERT.

and it may sometimes be advisable to add a plank facing to the timbers, so as to give the timber walls a greater strength to resist the pressure of the earth which presses against them from the rear.

In making your plans all of these various forms of construction should be considered, and that form should be decided upon which is best suited to the conditions as you find them, having in mind always the question of economy, but remembering that poor materials and careless work are the most expensive in the long run.

Cost of Materials.—A few suggestions on this point will be of service to you. If you decide to use centre drains you will find nothing better for this purpose than a line of ordinary farmer's hard burned drain tile. From some manufacturers the larger sizes of tile (5 inches and upward) can be obtained in lengths of 2 feet each, if desired; but in most cases, tile having three inches interior diameter, will be sufficient, and these are generally made in one foot lengths. It must be said, however, in favor of the larger sizes, and indeed in favor of tiling generally, that besides serving to quickly drain and dry the highway in summer, it hastens the removal of snow and frost from the line of the roadway in the early months of the year, by the admission of the warm spring air in the line of the pipe beneath. You know that a farm that is thoroughly under-drained can be plowed a week or ten days earlier in the spring because the soil is warmer, and by its warmth becomes friable; and it can be easily demonstrated that under-draining, which is of unquestioned value on nine-tenths of our American farms, is equally valuable as a means of drying and keeping in good condition the common dirt road.

For your convenience I insert the following brief tables giving the manufacturers' average "list" prices of tiling and the carrying capacity of different sizes of drain and sewer pipe according to the grades upon which they are laid. It is well to bear in mind, however, that most dealers quote a very substantial dis-

count from these prices, and that prices of tiling depend much upon the state of the market and other conditions, so that the prices given here will only serve as an approximate guide.

PRICE LIST OF HARD BURNED FARM DRAIN TILE.

Size.	Area in Inches.	Weight per foot.	Price per 1,000 Feet.	Curves and Reducers, Each.	1 Foot Branches, Each.	2 Foot Branches, Each.	No. Feet to Car Load.
2	3.141	3	\$ 20.00	\$.20	\$.30		8000
3	7.068	4 $\frac{1}{2}$	30.00	.20	.30		6000
4	12.566	6 $\frac{3}{4}$	45.00	.25	.30		4000
5	19.625	9	60.00	.30	.40	\$.50	3000
6	28.274	12	80.00	.40	.50	.70	2200
7	38.484	15	110.00	.50	.70	.75	2000
8	50.265	22	150.00	.70	.75	.90	1250
9	63.617	26	200.00	.75	1.00	1.00	1000
10	78.539	33	250.00	1.00		1.15	850
12	113.09	44	325.00	1.25		1.25	750
15	176.71	60	450.00	1.50		2.00	500
18	254.46	92	700.00	2.25		2.50	350
20	314.16	106	1000.00	3.00		4.00	250
21	345.00	110	1250.00	4.00		5.00	225
24	452.39	150	1625.00	5.00		6.50	200

CARRYING CAPACITY, GALLONS PER MINUTE.

Size of Pipe.	1 Inch Fall per 100 Ft.	2 Inch Fall per 100 Ft.	3 Inch Fall per 100 Ft.	6 Inch Fall per 100 Ft.	9 Inch Fall per 100 Ft.	1 Foot Fall per 100 Ft.	2 Feet Fall per 100 Ft.	3 Feet Fall per 100 Ft.
2 inch	6	9	13	19	23	27	37	46
3 inch	13	19	23	33	40	46	64	79
4 inch	27	38	47	66	81	93	131	163
6 inch	75	105	129	183	224	253	364	450
8 inch	153	216	265	375	460	529	750	923
9 inch	205	290	355	503	617	711	1206	1240
12 inch	422	596	730	1033	1273	1468	2076	2554
15 inch	740	1021	1282	1818	2224	2454	3617	4467
18 inch	1168	1651	2022	2860	3508	4045	5604	7047
20 inch	1560	2054	2450	3450	4180	4860	6850	8410
24 inch	2376	3381	4152	5871	7202	8803	11744	14466

Drain tile are made in the form commonly known as "round tile" and also in the form known as "sole tile," the latter having flattened upper and lower surfaces. It is preferred by many on account of its supposed advantages in laying, though it is somewhat heavier than the round tile and consequently more expensive in cost of transportation. The price is about the same.

The cost of vitrified clay culvert pipe, according to lists sent out by the manufacturers, will appear about as follows :

PRICE LIST OF STANDARD CULVERT PIPE.

	Per Foot.	Bends.	Branches, 2 ft.	Traps.
2 inch	\$0 14	\$0 40	\$0 63	\$1 00
3 inch	16	50	72	1 50
4 inch	20	65	90	2 00
5 inch	25	85	1 13	2 50
6 inch	30	1 10	1 35	3 50
8 inch	45	1 80	2 03	5 50
9 inch	55	2 25	2 48	6 50
10 inch	65	2 75	2 93	7 50
12 inch	85	3 50	3 83	10 00
15 inch	1 25	4 75	5 63	15 00
18 inch	1 70	6 50	7 65	
20 inch	2 25	7 50	10 13	
24 inch	3 25	11 00	14 63	
30 inch	5 50	20 00	24 75	

Slants.—Fifty per cent. more than plain pipe, measured on long side, but not less than 12 inches.

Increases and Reducers.—Double price of 2 feet of pipe size of larger end

Stoppers.—One-third of one foot of pipe of the size on which it is used.

Here, also, you may expect a substantial discount from the list prices, and such discounts will run from 70 per cent. upwards, according to the state of the market and other conditions.

Common rubble masonry can be laid at a cost of from \$3.50 upwards per cubic yard, depending on the cost of stone, hauling, cement, and the necessary preparatory work of excavation, scaffolding, etc.

In the use of cement, you will find that good American Rosendale will serve an excellent purpose. It should be finely ground and should not be weakened by the addition of too large a proportion of sand. One part of cement to two parts clean, sharp sand by actual measure, mixed dry, and then worked to a paste by the addition of a suitable quantity of water, will make an excellent, hard-setting and durable mortar, and I have known three parts of sand to one part of cement to supply good work in some cases where the cement was of excellent quality. In this connection I can only add that the quality of your sand will largely determine the holding power of your cement, and that all loamy, clayey material, and everything that tends to detract from the sharp, clean condition of your sand should be condemned and excluded from the work.

The cost of stone, timber and other materials used in your culverts and drains will depend so largely upon local conditions that I cannot serve you profitably by referring to them here.

(To be continued.)

SPECIFICATIONS FOR GRADING AND MACADAMIZING THE FLUSHING AND JAMAICA ROAD, QUEENS CO., N. Y.

By G. A. Roullier, C. E.

GRADING.

THE road mentioned in the agreement, and so much of the abutting roads as may be deemed necessary, shall be graded to the lines, grades and cross-sections given.

All earth excavated to be deposited and spread on the road and abutting roads as required.

Surplus earth, not needed by the engineer, to be wasted free of charge.

All trees, brush, stumps, rocks and bowlders to be removed from wherever directed.

No perishable material shall be used in forming any of the permanent embankments.

All embankments to be made in layers not exceeding one foot in thickness, and traffic allowed to pass over each layer as the work progresses.

All material suitable for surfacing the macadam trench shall be placed aside for that purpose.

Wherever the sub-grade soil in cuttings shall be found unsuitable to carry the macadam, the trench shall, if required, be deepened as directed, and brought back to sub-grade, with suitable material.

All grading will be paid for by the cubic yard of earth excavated and disposed of as required ; the price so paid, to cover the cost of grubbing, and that of the removal of rock and bowlders.

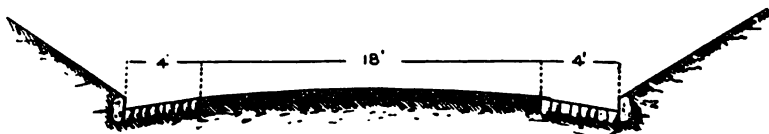
MACADAMIZING.

The roadway shall be macadamized eighteen feet wide from the Flushing Village line to the southerly side of Hillside avenue in the Village of Jamaica ; from that point to Fulton street the macadam shall extend completely across the roadway from one gutter pavement line to the other.

All macadam stone used shall be trap rock of good quality, ranging in size from one inch up to and including two inches, except as hereinafter provided ; the sizes to be thoroughly mixed

and the smaller sizes not to exceed in quantity thirty per cent. of the entire mass.

All rolling, except as hereinafter provided, shall be done



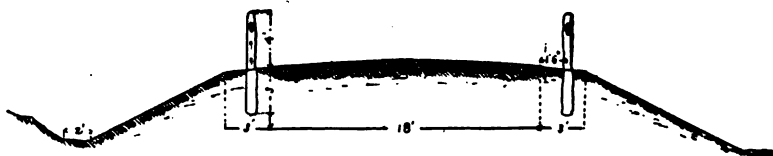
CROSS SECTION MACADAM ROAD AND PAVED GUTTER (IN EXCAVATED ROADWAY).

with a suitable steam road roller, weighing not less than ten nor more than twelve tons.

The trench for the macadam shall be excavated to the lines, grades and cross section required and the edges kept trimmed straight and parallel. This excavation will be paid for by the cubic yard at the rate bid for excavation, but no allowance will be made for such excavation on embankments.

The trench shall be steam rolled until all settling ceases, the grade and cross sections being maintained as the rolling progresses. This rolling shall be repeated from time to time in advance of the stone spreading, as may be required by the engineer.

The bottom of the trench shall be kept smooth and well trimmed in advance of the stone spreading.



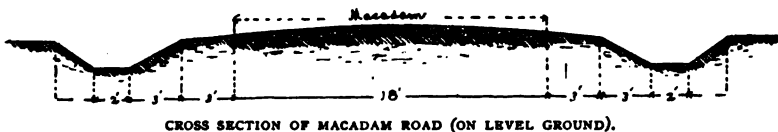
CROSS SECTION OF MACADAM ROADWAY (ON EMBANKMENT).

Should it be found impracticable to roll the bottom as provided for above, the sub-grade shall be lowered three inches and the space filled in with tailings from the stone breaker; these shall be covered with a light layer of sand and rolled to a bearing, sand being added as required while the rolling progresses. This foundation macadam will be paid for by the square yard at the price herein mentioned for such work, which price shall include the cost of the additional excavation required.

On the prepared sub-grade the macadam shall be spread to the following depths, loose measurement: Seven (7) inches at the centre of the road and at a point midway between the side and centre, and four and one-half ($4\frac{1}{2}$) inches at the side. The surface between the points of measurement to be crowned as

required. The stones when being spread shall be broadcast from shovels and the sizes thoroughly mixed.

The requisite depth and cross section having been obtained the stone shall be rolled to a bearing by passing the roller at least four times over every portion of the surface of the section. After which the macadam shall be filled with clean, coarse sand, free from gravel, well rolled and washed in and added in small quantities at a time as the rolling progresses. After which coarse trap rock screenings shall be added in small quantities at a time and rolled and sprinkled until the screenings cease sinking into the macadam, the rolling and sprinkling to continue until water flushes freely before the roller. Over this surface, and while it is still wet, a layer of clayey earth, not exceeding one-eighth ($\frac{1}{8}$) of an inch in thickness, shall be cast ; over this a layer of gravelly sand or fine gravel shall be evenly spread to a depth not exceeding one (1) inch in thickness. The sections to be then allowed to dry before travel passes over it. Whenever it may be deemed necessary by the engineer, a very small quantity of clayey earth shall be spread over the stones before the screenings are put on.



The cross section of the roadway shall be maintained during the rolling by the addition of stone as required.

The contractor shall take all necessary precautions to keep the trench well drained and in good shape, and he shall discontinue the spreading of stone or rolling whenever required so to do by the engineer.

The wings shall be thoroughly compacted with a horse roller weighing about two (2) tons immediately after the macadam has been spread and before the steam roller passes over it.

JIMSON.

JIMSON met a back section growler on the train up in the Schoharie district last week and exchanged views with him on the question of better roads for the farmers. Jimson found him gripping the arm of the car seat with his brawny fist as though he was not quite accustomed to speedy travel, and was appre-

hensive that something might get away. In his other hand he held a crumpled pamphlet on road improvement, and so Jimson felt encouraged to say something about the condition of the country roads. The Schoharie product made answer :

"Young man," said he, "I understand all about this new road-makin' idee. It is them bicycle fellers that want the roads, and I want you to understand that these roads was good enough for my grandfather, and what's good enough for him is good enough for me. If the bicycle fellers wants good roads let them go ahead and make 'em. You can't poke any of your new-fangled notions into us farmers."

"Well," said Jimson, "Of course I can't speak for your grandfather, friend Darius, nor for *his* grandfather; but I imagine that if you go back far enough in the line of your worthy ancestry, you might find a somewhat promiscuous collection of naked monkeys, and if you stick to the idea that their way of doing things is good enough for you, I might suggest that you go home and shed your sombre raiment. Now, about this road question, it is hard to fight ignorant prejudice, just as it is impossible to sell soap to a Digger Indian. The Indian's father and grandfather never used soap, and he can't see the good of it; but I may as well say a word for the bicycle rider, for I happen to be posted upon that point and you are not. A bicycle rider needs a path only six inches wide for the purposes of his vehicle, and the wheelmen of this country in their efforts to secure better roads, have spent enough money, time and zeal to build a bicycle path from Maine to California and back again. Their members are increasing, they are large property owners in both country and town, and they pay taxes on millions of dollars each year to support the government. A wheelman is simply a horse that talks, and he knows the tremendous waste of power and time which a poor road imposes in the use of any vehicle. If your horse could talk, friend Darius, and if the sixteen million other horses owned by the farmers of this country could talk, you would get a few points on the road question which were never dreamed of in your philosophy. You know everybody likes 'horse sense,' and when a wheelman talks 'horse sense' to you about better roads, don't take on such a hystericky expression. Ride a bicycle yourself for a month and then go home and shake hands with your poor old horse, and apologize to him for the kind of ignorance that has let you drive him through the mud for all these years."

HOW TO PURCHASE A HORSE.

MANY men believe themselves perfectly capable of purchasing a horse solely upon their own judgment, and decline to listen to the ever-ready hints and suggestions of friends. When they have reached such a point of self-confidence they very wisely ignore the encomiums bestowed by the vendor of the animal, and they have little or no faith in any warranty that can be concocted.

To such assured judges the advice herein tendered can have little interest beyond that of feeble curiosity, but to those whose worldly wisdom has only taught them the dangers of horse-dealing, it may prove attractive, and, it is hoped, instructive.

If the purchase is determined on, it is better, if possible, to come to the place where the animal is, unannounced, and without giving time for preparation on the part of the vendor. If the stable can be approached without the attendance of the owner, all the better. Supposing these conditions possible, the mode of procedure can be thus designated, subject only to such minute variation as the circumstances present.

Approach the stable quietly, and be very careful not to disturb the horse. In that way you can find out some of his imperfections. Be absolute about forbidding anyone else to go near him until you have minutely noted his position whilst standing in the stable. A tender-footed or lame horse generally favors himself in the part affected while in the stable.

If you are quite satisfied with him after this examination, have him brought out and saddled or harnessed, but do not permit either whip or spur to be used upon him. If he is lame or tender-footed, a smart groom can by whip or spur, or both, make him for a time forget his defect. Have him placed in some position between dark and light, so that you can make a thorough examination of his eyes. All horses' eyes in the sun appear much better than they really are, and it needs a very great deal of practical knowledge to estimate their quality. Two matters in this connection must receive particular attention: First, the crystal. Secondly, the bottom or ground of the eye. Look at the animal from rather an oblique position. If the eyes appear good, and not sunk too deep in the head, and the sight be free from spots, they may be considered as favorable signs. Any

rider or driver who hopes to save himself from broken bones should be particular about his horse's eyes and legs.

The horse's age is known by his teeth. If the animal is needed for park work or for the road, he should not be less than five years old, but here again remember that some dealers are guilty of the trick of cutting the animal's jaws in order to make him appear older than he is. It is a vile practice, and should be severely dealt with when discovered.

Horses of eight or ten years of age have a black speck in their teeth, but not unfrequently that speck is simulated, and can be detected by observing that, unlike the real mark, the false one is not hollow. At the age named, the lower teeth are all even, but the upper teeth are not absolutely even until the horse is twelve years old, excepting those pests of horseflesh called "crib-biters." At thirteen, the horse's upper and lower teeth appear nearly all even. At fourteen they overhang, and increase in length. These statements the horse-buyer can verify by examination.

Next, look well to the animal's withers, back and croup. See that his forelegs have no tendency to bend forward; observe whether he has any scars upon his knees, or upon the legs, some inches above or below. On all those parts the hair should lie evenly and sleekly, as indeed it should on every part of his body. If this be not the case, be assured that he is unsteady on his pins, and—let him alone!

The walk, trot and gallop have next to be criticised. These should be in perfect cadence, because they are natural paces. If a pavement is handy, clap the groom upon the animal and have him ridden over it, but still absolutely forbid the use of whip or spur, and be equally stringent in regard to any ill usage being practiced upon him.

Then note whether the animal's walk be bold, whether he cuts or interferes with his fore or hind feet. If any scars are perceptible on the inside of the legs, you may be certain that the horse does not go well upon them, although the farrier is sometimes to blame for sundry scars inflicted.

His trot should be steady, free, and performed with vivacity, two legs in the air and two on the ground. If the animal is sound in trotting, and walks well, then let him be galloped. When a horse gallops in a straightforward direction, he may lead with the right or left leg before, but the hind leg of the same side should immediately follow, or else the gallop is broken, and that

shows the horse to have been badly taught. A good horse-breaker generally makes the horse begin his gallop with his right leg foremost, especially when a corner has to be turned to the right hand, and if the direction is changed to the left, he will at once change, and take the left leg.

The walk, trot and gallop proving satisfactory, and the horse being found in all ways sound, and amiable in action, and obedient to the rider's or driver's hand, you may set him down as a valuable animal. Do not be satisfied with anything short of excellence in any of the particulars named, for one defect in the list may, and most probably will, entail others more or less dependent upon it. Life and limb are always at stake when using a horse, and he must be a foolish man who will accept anything but perfection in the animal upon which his safety and comfort depends.

A horse well broken-in will always improve under a good master, who will make a good horse out of an animal that has been originally well trained.—*The Rider and Driver.*



FATHER TOM AND THE POPE;

OR, A NIGHT AT THE VATICAN.*

[As related by Mr. Michael Heffernan, Master of the National School at Tallymactaggart, in the County of Leitrim, to a friend, during his official visit to Dublin, for the purpose of studying Political Economy, in the spring of 1838.]

CHAPTER I.

HOW FATHER TOM WENT TO TAKE POT-LUCK AT THE VATICAN.



WHEN his Riv'rence was in Room, ov coorse the Pope axed him to take pot-look wid him. More be token, it was on a Friday; but, for all that, there was plenty of mate; for the Pope gev himself an absolution from the fast on account ov the great company that was in it—at laste so I'm tould. Howandiver, there's no fast on the dhrink, anyhow—glory be to God!—and so, as they wor sitting, afther dinner, taking their sup together, says the Pope, says he, "Thomaus"—for the Pope, you know, spakes that away, all as one as one ov uz—"Thomaus *a lanna*," says he, "I'm tould you welt them English heretics out ov the face."

"You may say that," says his Riv'rence to him again. "Be my sowl," says he, "if I put your Holiness und her the table, you won't be the first Pope I floored."

Well, his Holiness laughed like to split; for, you know, Pope was the great Prodesan that Father Tom put down upon Purgathory; and ov coorse they knewn all the ins and outs of the



"WELL, HIS HOLINESS LAUGHED LIKE TO SPLIT."

* This famous production is doubtless the best of many short prose writings of its author, William Maginn, a talented Irishman, who was born in Cork ninety-eight years ago. He is said to have been a prince of good fellows; but the same lively, rollicking, imaginative genius which gave mirth to his stories, only added to the woes of his reckless and improvident nature, and led him to habits of dissipation and sometimes to the debtor's prison. Maginn was finely educated, a splendid translator, a poet of some merit and a prolific and rapid writer, though to his lack of application may be attributed the fact that many of his articles were ephemeral. His death, which was doubtless hastened by wild living, occurred in 1842.

contravarsy at Room. "Faix, Thomaus," says he, smiling across the table at him mighty agreeable—"it's no lie what they tell me, that yourself is the pleasánt man over the dhrop ov good liquor."

"Would you like to thry?" says his Riv'rence.

"Sure, and am n't I thrying all I can?" says the Pope. "Sorra betther bottle ov wine's betuxt this and Salamancha, nor 's there fornenst you on the table; it's raal Lachrymalchrystal, every spudh ov it."

"It's mortal could," says Father Tom.

"Well, man alive," says the Pope, "sure and here's the best ov good claret in the cut decanther."

"Not maning to make little ov the claret, your Holiness," says his Riv'rence, "I would prefir some hot wather and sugar, wid a glass ov spirits through it, if convanient."

"Hand me over the bottle of brandy," says the Pope to his head butler, "and fetch up the materi'ls," says he.

"Ah, then, your Holiness," says his Riv'rence, mighty eager, "maybe you 'd have a dhrop ov the native in your cellar? Sure it's all one throuble," says he, "and, troth, I dunna how it is, but brandy always plays the puck wid my inthrails."

"Pon my conscience, then," says the Pope, "it's very sorry I am, Misther Maguire," says he, "that it isn't in my power to plase you; for I'm sure and certaint that there's not as much whiskey in Room this blessed minit as 'ud blind the eye ov a midge."

"Well in troth, your Holiness," says Father Tom, "I knewn there was no use in axing; only," says he, "I didn't know how else to exqueeze the liberty I tuck," says he, "of bringing a small taste," says he, "of the rale stuff," says he, hauling out an imperi'l quart bottle out ov his coat-pocket; that "never seen the face ov a gauger," says he, setting it down on the table fornenst the Pope; "and if you'll jist thry the full ov a thimble ov it, and it doesn't rise the cockles ov your Holiness's heart, why then, my name," says he, "isn't Tom Maguire!" and wid that he outs wid the cork.



"'THE RALE STUFF,' SAYS HE."

Well, the Pope at first was going to get vexed at Father Tom for fetching dhrink thataway in his pocket, as if there wasn't lashins in the house; so says he, "Misther Maguire," says he, "I'd have you to comprehind the differ betuxt an inwitation to dinner from the succissor of Saint Pether, and from a common nagur of a Prodesan squireen that maybe hasn't liquor enough in his cupboard to wet more nor his own heretical whistle. That may be the way wid them that you wisit in Leithrim," says he, "and in Roscommon; and I'd let you know the differ in the



"BLESSED VARGIN, BUT IT HAS
THE DIVINE SMELL!"

prisint case," says he, "only that you're a champion ov the Church and entitled to laniency. So," says he, "as the liquor's come, let it stay. And in troth I'm curis myself," says he, getting mighty soft when he found the delightful smell ov the *potteen*, "in inwistigating the composition ov distilled liquors; it's a branch of natural philosophy," says he, taking up the bottle and putting it to his blessed nose. Ah! my dear, the very first snuff he got ov it, he cried out, the dear man, "Blessed Vargin, but it has the divine smell!" and crossed

himself and the bottle half a dozen times running.

"Well, sure enough, it's the blessed liquor now," says his Riv'rence, "and so there can be no harm any way in mixing a dandy of punch; and," says he, stirring up the materi'ls wid his golden muddler—for every thing at the Pope's table, to the very schrew for drawing the corks, was ov vergin goold—"if I might make bould," says he, "to spake on so deep a subjc afore your Holiness, I think it 'ud considherably whacilitate the inwestigatation ov its chemisthry and phwarmacapeutics, if you'd jist thry the laste sup in life ov it inwardly."

"Well, then, suppose I do make the same experiment," says the Pope, in a much more condescending way nor you'd have expected—and wid that he mixes himself a real stiff facer.

"Now, your Holiness," says Father Tom, "this bein' the first time you ever dispensed them chymicals," says he, "I'll just make bould to lay down one rule ov orthography," says he, "for conwhounding them, *secundum mortem*."

"What's that?" says the Pope.

"Put in the sperits first," says his Riv'rence; "and then put

in the sugar; and remember, every dhrop ov wather you put in afther that spoils the punch."

"Glory be to God!" says the Pope, not minding a word Father Tom was saying. "Glory be to God!" says he, smacking

his lips. "I never knewn what dhrink was afore," says he. "It bates the Lachrymalchrysal out ov the face!" says he—"it's necthar itself, it is, so it is!" says he, wiping his epistological mouth wid the cuff ov his coat.

"'Pon my secret honor," says his Riv'rence, "I'm raaly glad to see your Holiness set so much to your satiswhaction; especially," says he, "as, for fear ov accidents, I tuck the liberty ov fetching the fellow ov that small



"PUT IN THE SPIRITS FIRST," SAYS HIS RIV'RENCE."

vesshel," says he, "in my other coat-pocket. So devil a fear ov our running dhry till the but end of the evening, anyhow," says he.

"Dhraw your stool in to the fire, Misther Maguire," says the Pope, "for faix," says he, "I'm bent on analizing the metaphwysics ov this phinomenon. Come, man alive, clear off," says he, "you're not dhrinking at all."

"Is it dhrink," says his Riv'rence; "by Gorra, your Holiness," says he, "I'd dhrink wid you till the cows 'ud be coming home in the morning."

So wid that they tackled to, to the second fugee apiece, and fell into larned discourse. But it's time for me now to be off to the lecthir at the board. Oh my sorra light upon you, Doctor Whately, wid your pilittical econimy and your hyderastatics! What the *dioul* use has a poor hedgemaster like me wid sich deep larning as is only fit for the likes ov them two that I left over their second tumbler? Howandiver, wishing I



"THEY TACKLED TO, TO A SECOND FUGEE APIECE, AND FELL INTO A LARNED DISCOURSE."

was like them, in regard ov the sup ov dhrink, anyhow, I must brake off my norration for the prisint; but when I see you again, I'll tell you how Father Tom made a hare ov the Pope that evening, both in theology and the cube root.

CHAPTER II.

HOW FATHER TOM SACKED HIS HOLINESS IN THEOLOGY AND LOGIC.

Well, the lecthir's over, and I'm kilt out and out. My bitter curse upon the man that invinted the same boord! I thought ons't I'd fadomed the say ov throuble; and that was when I got through fractions at ould Mat Kavanagh's school, in Firdramore—God be good to poor Mat's sowl, though he did deny the cause the day he suffered! but it's fluxions itself we're set to bottom now, sink or shwim! May I never die if my head isn't as throughother as any thing wid their ordinals and cardinals—and, begob, it's all nothing to the econimy lecthir that I have to go to at two o'clock. Howandiver, I mustn't forget that we left his Riv'rence and his Holiness sitting fornenst one another in the parlor ov the Vatican, jist afther mixing their second tumbler.

When they had got well down into the same, they fell, as I was telling you, into larned discourse. For, you see, the Pope was curious to find out whether Father Tom was the great the-

ologian all out that people said; and says he: "Misther Maguire," says he, "what answer do you make to the heretics when they quote them passidges agin thransubstantiation out ov the Fathers?" says he.

"Why," says his Riv'rence, "as there should be no sich passidges I make myself mighty aisy about them; but if you want to



"'MISTHER MAGUIRE,' SAYS HE, 'WHAT ANSWER DO YOU MAKE TO THE HERETICS.'"

know how I dispose ov them," says he, "just repate one ov them, and I'll show you how to catapomphercate it in two shakes."

"Why, then," says the Pope, "myself disremimbers the particular passidges they alledge out ov them ould felleys," says he, "though sure enough they're more numerous nor edifying—so we'll jist suppose that a heretic was to find such a sayin' as this

in Austin, 'Every sensible man knows that thransubstantiation is a lie'—or this out ov Tertullian or Plutarch, 'The bishop ov Room is a common imposther'—now tell me, could you answer him?"

"As easy as a kiss," says his Riv'rence. "In the first, we're to understand that the exprission, 'Every sinsible man,' signifies simply, 'Every man that judges by his nath'ral sinse;' and we all know that nobody folleying them seven deludhers could ever find out the mysthery that's in it, if somebody didn't come into his assistance wid an eighth sinse, which is the only sinse to be depended on, being the sinse of the Church. So that, regarding the first quotation which your Holiness has supposed it makes clane for us, and tee-totally agin the heretics."

"That's the explanation sure enough," says his Holiness; "and now what div you say to my being a common imposther?"

"Faix, I think," says his Riv'rence, "wid all submission to the betther judgment ov the learned father that your Holiness has quoted, he'd have been a thrifle nearer the thruth, if he had said that the bishop ov Room is the grand imposther and top-sawyer in that line over us all."

"What do you mane?" says the Pope, getting quite red in the face.

"What would I mane?" says his Riv'rence, as composed as a doctor of physic, "but that your Holiness is at the head ov all them—throth I had a'most forgot I wasn't a bishop myself," says he (the deludher was going t say, as the head of all *us*)—"that has the gift of laying on hands. For sure," says he, "imposthur and *imposithir* is all one, so you've only to undherstand *manuum*, and the job is done. Awouch!" says he, "if any heretic 'ud go for to cast up sich a passidge as that agin me, I'd soon give him a lesson in the p'lite art ov cutting a stick to welt his own back wid."

"'Pon my apastolical word," says the Pope, "you've cleared up them two pints in a most satiswhactery manner."

"You see," says his Riv'rence—by this time they wor mixing their third tumbler—"the writings ov them Fathers is to be thrated wid great veneration, and it 'ud be the height ov presumption in any one to sit down to interpret them widout providing himself wid a genteel assortment ov the best figures ov rhetoric, sich as mettonymy, hyperbol, cattychraxis, prolipsis, mettylipsis, superbaton, pollysyndreton, hustheronprotheron, prosodypeia and the like, in ordher that he may never be at a

loss for shuitable sintiments when he comes to their high-flown passidges. For unless we thrate them Fathers liberally to a handsome allowance of thropes and figures, they'd set up heresy at ons't, so they would."

"It's thrue for you," says the Pope; "the figures ov spache is the pillars ov the Church."

"Bedad," says his Riv'rence, "I dunna what we'd do widout them at all."

"Which one do you prefir?" says the Pope; "that is," says he, "which figure ov spache do you find most usefullest when you're hard set."

"Metaphour's very good," says his Riv'rence, "and so's



"'PON MY APOSTOLICAL WORD,' SAYS THE POPE, 'YOU'VE CLEARED UP THEM TWO PINTS IN A MOST SATISWHACTERY MANNER.'"

mettonymy—and I've known prosodypeia stand to me at a pinch mighty well—but for a constancy, superbaton's the figure for my money. Devil be in me," says he, "but I'd prove black white as fast as a horse 'ud throt wid only a good stock ov superbaton."

"Faix," says the Pope, wid a sly wink, "you'd need to have it backed, I judge, wid a small taste of assurance."

"Well, now, jist for that word," says his Riv'rence, "I'll prove it widout aither one or other. Black," says he, "is one thing and white is another thing. You don't conthravene that? But every thing is aither one thing or another thing; I defy the

Apostle Paul to get over that dilemma. Well! If any thing be one thing, well and good; but if it be another thing, then it's plain it isn't both things, and so can't be two things—nobody can deny that. But what can't be two things must be one thing—*Ergo*, whether it's one thing or another thing it's all one. But black is one thing and white is another thing—*Ergo*, black and white is all one. *Quod erat demonstrandum.*"

"Stop a bit," says the Pope, "I can't althegither give in to your second minor—no—your second major," says he, and he stopped. "Faix, then," says he, getting confused, "I don't rightly remimber where it was exactly that I thought I seen the flaw in your premises. Howsomdiver," says he, "I don't deny that it's a good conclusion, and one that 'ud be ov mater'l service to the Church if it was dhrawn wid a litle more distinctiveness."

"I'll make it as plain as the nose on your Holiness's face, by superbation," says his Riv'rence. "My adversary says, black is not another color, that is, white? Now that's jist a parallel passidge wid the one out of Tartullian that me and Hayes smashed the heretics on in Clarendon sthreet, 'This is my body—that is, the figure ov my body.' That's a superbaton, and we showed that it oughtn't to be read that way at all, but this way, 'This figure ov my body *is* my body.' Jist so wid my adversary's proposition, it mustn't be undherstood the way it reads, by no manner of manes; but it's to be taken this way—'Black—that is white, is not another color'—green, if you like, or orange, by dad, for anything I care, for my case is proved. 'Black,' that is, 'white,' lave out the 'that' by sinnalayphy, and you have the orthodox conclusion, 'Black is white,' or by convarson, 'White is black.'"

"It's as clear as mud," says the Pope.

"Begad," says his Riv'rence, "I'm in great humor for disputin' to-night. I wisht your Holiness was a heretic jist for two minutes," says he, "till you'd see the flaking I'd give you!"

"Well then, for the fun o' the thing, suppose me my



"'IT'S AS CLEAR AS MUD,' SAYS THE POPE."

namesake, if you like," says the Pope, laughing, "though, by Jayminy," says he, "he's not one that I take much pride ov."

"Very good—devil a bettther joke ever I had," says his Riv'rence. "Come, then, Misther Pope," says he, "hould up that purty face ov yours, and answer me this question. Which 'ud be the biggest lie, if I said I'd seen a turkey-cock lying on the broad ov his back, and picking the stars out ov the sky, or if I was to say that I seen a gandher in the same intherestin' posture, raycreating himself wid similar asthronomical experiments? Answer me that, you ould swaddler?" says he.

"How durst you call me a swaddler, sir!" says the Pope, forgetting, the dear man, the part that he was acting.

"Don't think for to bully me!" says his Riv'rence, "I always daar to spake the truth, and it's well known that you're nothing but a swaddling ould sinner ov a saint," says he, never letting on to persave that his Holiness had forgot what they were agreed on.

"By all that's good," says the Pope, "I often hard ov the imperance ov you Irish afore," says he, "but I never expected to be called a saint in my own house either by Irishman or Hot-tentot. I'll till you what, Misther Maguire," says he, "if you can't keep a civil tongue in your head, you had bettther be walking off wid yourself, for I beg lave to give you to undherstand, that it won't be for the good ov your health if you call me by sich an outprobious epithet again," says he.

"Oh, indeed! then things is come to a purty pass," says his Riv'rence (the dear funny soul that he ever was!) "when the likes ov you compares one of the Maguires ov Tempo wid a wild Inge? Why, man alive, the Maguires was kings of Fermanagh three thousand years afore your grandfather, that was the first of your breed that ever wore shoes and stockings (I'm bound to say, in justice to the poor Prodesan, that this was all spoken by his Riv'rence by way of a figure of spache), was sint his majesty's arrant to cultivate the friendship of Prince Lee Boo in Botteney Bay! Oh Bryan dear," says he, letting on to cry, "if you were alive to hear a *boddagh Sassenagh* like this casting up his counthry to one of the name of Maguire!"

"In the name ov God," says the Pope, very solemniously "what *is* the maning ov all this at all at all," says he.

"Sure," says his Riv'rence, whispering to him across the table, "sure you know we're acting a conthrawarsy, and you tuck the part of the Prodesan champion. You wouldn't be

angry wid me. I'm sure, for sarving out the heretic to the best ov my ability."

"Oh, begad, I had forgot," says the Pope, the good-natured ould crethur; "sure enough you were only taking your part, as a good Milesian Catholic ought, agin the heretic Sassenagh. Well," says he, "fire away now, and I'll put up wid as many controversial compliments as you plase to pay me."

"Well, then, answer me my question, you santimonious ould dandy," says his Riv'rence.

"In troth, then," says the Pope, "I dunna which 'ud be the biggest lie; to my mind," says he, "the one appears to be about as big a bounce as the other."



"WHAT IS THE MANING OV ALL THIS, AT ALL AT ALL," SAYS HE."

"Why, then, you poor simpleton," says his Riv'rence, "don't you persave that, forbye the advantage the gandher 'ud have in the length ov his neck, it 'ud be next to ompossible for the turkey-cock lying thataway to see what he was about, by rason of his djollars and other accouthrements hanging back over his eyes! The one about as big a bounce as the other! Oh, you misfortunate crethur! if you had ever larned your A B C in theology, you'd have known that there's a differ betuxt them two lies so great, that, begad, I wouldn't wondher if it 'ud make a balance ov five years in purgathory to the sowl that 'ud be in it. Ay, and if it wasn't that the Church is too liberal entirely, so she is, it 'ud cost his heirs and succissors betther nor ten pounds to have him out as soon as the other. Get along, man, and take half a year at dogmatical theology; go and read your Dens, you poor dunce, you!"

"Raaly," says the Pope, "you're making the heretic's shoes too hot to hould me. I wundher how the Prodesans can stand afore you at all."

"Don't think to delude me," says his Riv'rence; "don't think to back out ov your challenge now," says he, "but come to the scratch like a man, if you are a man, and answer me my question. What's the rason, now, that Julius Cæsar and the

Vargin Mary was born upon the one day?—answer me that, if you wouldn't be hissed off the platform."

Well, my dear, the Pope couldn't answer it, and he had to acknowledge himself sacked. Then he axed his Riv'rence to tell him the rason himself; and Father Tom communicated it to



"WHAT'S THE RASON, NOW, THAT JULIUS CÆSAR AND THE VARGIN MARY WAS BORN ON THE SAME DAY?—ANSWER ME THAT, IF YOU WOULDN'T BE HISSED OFF THE PLATFORM."

him in Latin. But as that is a very deep question, I never hard what the answer was, except that I'm tould it was so mysterious it made the Pope's hair stand on end.

But there's two o'clock, and I'll be late for the lecthir.

(To be continued.)

*"Frame your mind to mirth and merriment,
Which bars a thousand ills, and lengthens life."*—SHAKESPEARE.



THE EDITORS TABLE

The *Cosmopolitan* has undertaken the interesting task of solving the problem of aerial navigation. Its recent numbers have presented the subject in so enticing a manner, that one can hardly read without believing it possible that this long attempted method of human travel will some day come to pass.

Here then, is the true panacea for all the woes which the mud road imposes upon the bipeds and quadrupeds that belong to the farm outfit. It will no longer be necessary for the toiling agriculturist to waste his summer days in the diversion of swapping yarns and pawing the soil of the country road in settlement of road taxes, nor will it seem even necessary to keep the wheeled carriage or the farm wagon; for the road of the future is the pathless, trackless atmosphere through which, in our mind's eye, we see sailing from farm to market an uninterrupted stream of buoyant vehicles, laden with farm products and filling the air with the fragrance of onion tops, asparagus and new-mown hay. There may be something quaint and unusual in this picture, which strikes the untutored reader with a sense of its improbability; but it is by no means safe to scout any philosophical proposition nor to deny its value.

The simple solution in this case seems to be, that all a farmer need do is to load his peas and potatoes into an aluminium ark, which is to be made light enough either to float in water or to soar in air, and then, by means of a detachable upper story, consisting of a cigar-shaped gas bag, which is tied with two half hitches and a bight to the side walls of the vegetable-bin; he is raised into the air to a convenient distance above the smoke of his neighbor's chimneys, whence, by means of an ingeniously contrived rudder, and an array of wings that seem formidable enough to terrify all the birds of Heaven, the complacent farmer guides himself hither and thither, to the market, the post office, the polls, or the meeting-house, dropping seed potatoes in the plowed soil of his back lot, or paving-stones on the heads of his political enemies or his delinquent debtors, as circumstances may impel. "There is a tide in the affairs

of men," says Shakespeare "which, taken at the flood, leads on to fortune," and some day amid the desperate discouragement of trying to induce the farmers of America to build hard roads for their own salvation, we may be tempted to recommend a general adoption of the *Cosmopolitan* gospel of wings and gas. Indeed, if present reports from the back districts may be relied on, the only certain means of land transportation just now is either stilts or balloons, and as the stilts are in no way sufficient to serve as carriers of country produce, it may appear that the balloon-gear vegetable-bin is, after all, the only practical ultimatum. It is certainly clean; its progress would be effected without jolting, and the consequent spilling of eggs and apples along the roadway, while the expense of harness, horses and oats would be wholly saved, and a light and airy observation-roost insured to the farmer from which we might, at the same time, study the weather, observe the goings on within the precincts of the whole county, and by an occasional sniff of the morning air, determine the kind and quality of our neighbor's breakfast. The whole thing had better be carefully looked up.

THE sweet-scented scheme of some of our New York "400" to turn the west side of Central Park into a sort of aldermanic race-course, from which equestrians and wheelmen should be excluded, will find a formidable and healthy opposition if it ever gets fairly on its legs. The pretended object of this scheme, "to relieve the crowded condition of the present drives," is to be attained, as stated by one of the seductive and insinuating champions of the project, by taxing the entire community to pay for the luxury of a trotting course, which shall be used and enjoyed by a limited few. When Messrs. Coster, Delavergne, Bonner and others appeared before the Park Commissioners last month to urge the advancement of this new project, a little close questioning revealed the "nigger" in his natural color, and it turned out that it was not a driveway but a "speedway" that

was desired, where fast horses could be driven to the exclusion of all other vehicles. These gentlemen were promptly informed by Commissioner Dana that the masses of the people were not asking for additional drive-ways of any kind; and that the citizens of New York were opposed to any law which favors only a few owners of fast horses.

The scheme is not yet dead, but in the language of the old Hickory almanac, "it smells to heaven."

—

WE have a letter, written from one of the interior counties of the great State of New York and signed by a gentleman who bears the euphonious cognomen of Matthew T. Cade. Mr. Cade has opinions which may be said at least to make up in force what they lack in quality. He would remind us (he says) of the fact that our sturdy and strong-limbed forefathers developed this country from a forest to a civilized commonwealth, and that the country roads, having been good enough for the purposes of these sturdy ancestors, should be quite excellent enough for their descendants. Mr. Cade goes to considerable length to condemn the agitators for road improvement, and says: "Give the farmers of this state a fair price for their farm products and they will manage to get to market without the aid of fancy roads and theoretical road makers." There is food for reflection in this letter of Mr. Cade. In the first place, we reflect upon the old saying that "blood will tell," and, were it not for a few unfortunate gaps in genealogical record, we should undertake with considerable confidence to dispel our very slim doubt that this Mr. Cade is a lineal descendant of the original Jack. At any rate, the coincidence of names and similarity of sentiment would fairly warrant this conclusion. It was Mr. Jack Cade who, in the vigor of his rebellion, and feeling a wholesome contempt for theorists and agitators, addressed himself to his prisoner, Lord Say: "I am the besom that must sweep the court clean of such filth as thou art. Thou hast most traitorously corrupted the youth of the realm in erecting a grammar school; and whereas, before, our forefathers had no other books but the score and the tally, thou hast caused printing to be used, and, contrary to the king, his crown and dignity, thou hast built a paper mill. It will be proved to thy face that thou hast men about thee that usually talk about a noun and a verb, and such abominable words as no Christian ear can endure to hear."

But, alas, in the process of time, the score and the tally have gone to dust with the bones of the illustrious Jack; and although he cut off the head of poor Lord Say, the grammar school and the paper mill have grown in the affection of the people and have become fixtures in every civilized community.

We hope our later Mr. Cade and his followers will give heed to the modern march of progress and consider these matters in their true light. Our remote ancestors are said to have lived in caves; to have worn scant clothing; to have eaten raw food; to have cracked each other's skulls with huge clubs, and to have indulged in other oddities of custom that even Mr. Cade would hardly commend for modern use. Even our later ancestors combatted with the force of nature, not so much from choice as from necessity, and it would be a lame argument to say that because the earlier settlers of Onondaga County—the original builders of the dirt road—lived in log shanties, battled with the wolves and coyotes, and fenced their farms by the use of yellow dogs, that, therefore, later methods should be condemned, or that old methods should be even tolerated.

—

PATIENCE is a sublime virtue; but patience without work will neither weave nor build, and there is something half ridiculous and half pathetic in the sight of a farmer who wades and wallows in deep mud for six days in the week and resists an intelligent effort for road reform which may serve to elevate him socially and put money in his pocket. Even Sunday, his usual day of rest, seems to offer him no opportunity to contemplate the real situation; for it is then you may see him in Sunday-school, fired with the enthusiasm of worship and waving his tuning fork before the eyes of the bespattered youngsters, whom he leads through the lines of that suggestive song:

"We wait in patience to behold

The gates of pearl, the streets of gold"—

a poetic picture which ought to stimulate an ambition for good solid roadways, even in the management of temporal concerns. But the idea is of slow growth, as are all ideas, most of all, new ones.

It is a great misfortune to get into a rut, morally, socially or commercially, and besides being infinitely worse for a nation than for an individual, the worst of all ruts, from the standpoint of public economy, for the citizen, the town and the state, is the rut of the mud road.

LAWS AND LEGISLATION

WE learn from the Columbus (Ohio) *Dispatch* that a bill has been introduced into the legislature of that state to provide for the uniform improvement of roads in the various counties. The *Dispatch* says:

"Representative Gaumer has formulated into a bill some new ideas with regard to the improvement of country roads, which he believes will go a long way toward solving the vexed problem. His bill, introduced this afternoon, first submits to a vote of the people at the general election following its passage, the question as to whether or not they desire to adopt the new law and improve roads under its provisions. If not approved at the first election the question may be again submitted on the petition of two hundred citizens. The bill provides that each county shall constitute a road district for the improvement of roads. The Road Commissioners, three in number, are to be appointed by the Common Pleas Judge, with the approval of the County Commissioners. This board determines upon what roads shall be improved and is authorized to issue bonds for the purpose, levying a tax to meet the cost, but the tax is limited to five one-thousandths of the duplicate in any year. The Commission decides upon the character of the improvements and the material to be used, appoints a clerk and inspectors, and exercises general and personal supervision while the work is in progress. No part of the improvement can be made within an incorporated city or town, and the Commission is prohibited from selecting parallel roads within two miles of each other, when one is improved, until the remaining roads in the county receive the benefit of the law. Each Commissioner is required to devote his entire time to the duties and to receive a salary of \$2,000. When the roads in the county have been improved, the law terminates the Commission and the improvements are turned over to the County Commissioners, who are required to look after the matter of keeping them in repair."

THE next Illinois legislature will be asked to consider a bill appropriating \$10,000,000 to improve the roads of that state. It will provide that the governor appoint four men, two from the party that cast the highest vote at the last election for governor, and two from the party that polled the next highest vote. These four shall constitute a Board of Road Commissioners, whose duty it shall be

to look after the highways of the state, build new and good roads, keep the old roads in repair, and by degrees build up the condition of the public way. There is a provision giving the Road Commissioners the power to borrow the sum of \$10,000,000, which shall be expended in the work. The cyclists will visit Springfield in force and will do their best to interest the farmers, who will derive the most benefits, to rally to the support of the measure. The campaign for good roads in Illinois will then be on in earnest. There is not a good highway leading out of Chicago, and the roads most of the time are almost impassable. It may not be necessary to borrow the money, but the provision is put in the bill for emergency which may not arise. The century road club and every cycling club in the state will fight to push the reform through the legislature.

THE New York State Board of Trade has taken unanimous action in favor of a bill providing for the employment of convict labor on the wagon roads in the various counties. The bill provides that male prisoners over 18 years of age, and physically able to perform manual labor, shall be enrolled by the wardens of the several state prisons as subject to draft for road construction and maintenance. Prisoners under sentence of death are exempt. Eight hours are assigned as a day's work, and every convict who faithfully discharges his duties is to have ten per cent, of his sentence term commuted independent of commutations already provided for by law. The state engineer and deputies shall constitute a board to determine what roads shall be improved and elaborate provisions are made as to the manner in which the work shall be performed.

Commenting on the merits of this measure the *Troy Morning Telegram*, says: "It is undeniable that convicts cannot safely be kept in idleness. To deprive them of work is to be cruel to them and unfair to their supporters. But it is equally undeniable that public sentiment in this state will not tolerate their coming into ruinous competition with free labor. If there is a medium course between these two extremes whereby convicts can be made pay in some measure the cost of their maintenance without causing conflict with the rights of honest toilers it should be unhesitatingly adopted. We may be mistaken, but it seems to us that this course is disclosed in the proposition to put the "jail birds" at work upon the roads."



NEWS AND COMMENT

THE Executive Board of the Wisconsin Division recently subscribed for one hundred copies of GOOD ROADS, and directed them to be sent to a hundred selected citizens of that state. This was supplemented by a personal letter to each of these one hundred citizens, which is so admirably gotten up and so effective in its language that we should be glad, did space permit, to copy it entire. Here is a single sentence: "We ask you to examine all articles appearing in this magazine in an argumentative frame of mind; argue with the writer, then put those ideas and your own together and go and discuss them with your neighbor; if anyone submits a proposition you have not yet fully investigated, send to us, and it will soon be discussed in the columns by able writers." If the same interest as that displayed by the Wisconsin Division could be manifested among State Divisions all over the country, the roads improvement movement would soon be on the top wave of success.

THE New York *World* recently published a very striking cartoon representing diverse conditions in two adjacent counties of New Jersey. The *World* shows in the centre the county line, and on one side are seen heavily loaded wagons jogging easily along the macadamized roads, while on the other the farmers are hub deep in the mud, struggling along with half empty wagons, after the usual mud road fashion. The picture is labeled "Middlesex Mud and Union Macadam."

ONE of the first cities in the Union to use brick for street paving purposes was Jacksonville, Ill. A correspondent informs us that the pavement is made up of one layer of cinders about eight inches thick, upon which is placed a thin layer of sand. Upon the sand is laid one layer of hard burned brick, laid flatwise, then another layer of sand, and, as a top course, one layer of hard burned brick, set edgewise. The city has now nearly ten miles of pavement of this kind, and the

city council has passed ordinances for about three miles more to be laid during the present year.

"ROAD traffic hereabouts was suspended for ten days before Christmas—the very time when heaviest trade was expected—on account of the terrible condition of the clay roads."—*W. W. Beadell, Publisher The News, Yellow Creek, Ill.*

B. L. ROBERTS of Canton, Miss., has issued a practical and stirring circular to the people of Madison County in that state, and introduces some figures of an interesting kind, Mr. Roberts says:

"Take as a basis of reasoning and calculation the number of bales of cotton raised in Madison County, now about 30,000. With good roads the expense of hauling provisions and all other goods to the plantation, and the hauling of cotton and other products to the market would be reduced at least one-half, at a low estimate \$1 to every bale raised. This shows a direct saving to the planters of \$30,000 per annum. Now as to cost of good roads, though we will show hereafter that taxes would not be increased one mill because of them. Figures do not mislead. Suppose we commence and build each year five miles of good roads, costing about \$4,000 per mile, total \$20,000 each year. Issue thirty year bonds for same at rate of interest of four per cent. Continue this for twenty years until we have one hundred miles of first-class roads in the country, making an average debt to the county for the next fifty years of \$240,000. Payment of interest and sinking fund would be \$17,600 per annum. This makes the coming generation stand their proportion of the expense, which, in justice, they ought to do.

"Against this expense the county will have saved every year \$30,000, on its own hauling, besides the great advance of values, which is certain to come, and economy in wagons, live-stock and time, and also the incidental profits of additional receipts from other countries. Remember that good roads do not cost as much to repair as the old mud ditches heretofore called roads."

REPRESENTATIVE RICHMOND of the Iowa Legislature, has introduced a bill which provides that all the road districts in the town-

ship shall be consolidated into one, and be under the direction of a superintendent appointed by the township trustees; that all road taxes shall be collected in money, and all road work let by contract to the lowest bidder. Many of the Iowa papers have commented favorably on this bill, and the Iowa Division of the League is taking a lively interest in its progress.

A letter from C. T. Tupper, of Rock Rapids, says: "I send you an item for GOOD ROADS to show you that the great state of Iowa, first in many things, and near the top in others, does not propose to be behind on the question of roads improvement."

THERE's a good deal of ginger in the way the Asbury Park wheelmen keep up the road improvement agitation. The Asbury Park *Journal* is doing heroic work in the same line and prints much effective matter furnished by the club, in return for which the club purchases a large number of these papers and distributes them among prominent agriculturists. A letter from Chairman Zacharias of the Street Improvement Committee, says. "It is our intention to keep the educational work going right on till Monmouth County takes at least one step forward in the good road movement."

SECRETARY-TREASURER W. W. WATTS, of Kentucky, is doing magnificent work through the columns of the *Louisville Post*, by publishing strong articles in favor of better roads and sending copies of the paper in large numbers to the best citizens of the state. Each Saturday edition of the *Post* prints as a special feature an article on this subject.

HERE is a spicy array of facts from the oil regions of Ohio. We clip it from the *Steubenville, Ohio, Star*.

Usually in an oil field many teams are to be found hauling materials to the wells. The weather and the condition of the roads rarely check the oil development teamster in his mad career in the race for wealth. When wet weather threatens a mud embargo, he meets the difficulty by hauling fewer joints of pipe, makes his four horse an eight horse team, and increases the usual carrying rates fourfold. These gay buccaneering teamsters have encountered an obstacle in the McDonald field from an entirely unexpected quarter. *The roads have now become so bad that the Humane Society has decided that to drive horses over*

them is cruelty to animals, and the teamsters have been notified that they must not bring them out, else they will be prosecuted by the agents of that well known society. As a consequence there was not a team in the field yesterday, and those operators in need of materials were compelled to shut down until there is an improvement in the rural highways.

CHIEF CONSUL CHOATE, of Minneapolis, Minn., is entitled to credit for the suggestion that declarations for improving the public roads be presented at the National Republican Convention, to be held at Minneapolis. It would be no great mistake to try this experiment on the Democratic Convention also, just for the sake of testing what kind of stuff these modern statesmen are made of.

THE *Toledo Blade* of March 8th., has the following:—

Violators of the stone road law may now expect to receive due punishment for their indifference to its observance. An example was made of Michael Condon at Auburndale yesterday afternoon in the court of Squire Freeman. Condon was fined \$20 and costs, enough to help materially in the purchase of broad tires.

He was arrested on Saturday last for carrying more than 2,000 pounds with narrow tires, over the Monroe Street stone road. The County Commissioners are very zealous in this effort to protect the roads, they have had built, and are pushing an improvement of the law at Columbus. As it exists, there are hindrances to the enforcement of the provision. One thing for which they seek is legislative authority to employ an officer to find offenders and make arrests. As it is, some citizen must make complaint, not always a sure way of securing the punishment of violators.

It is encouraging to find that one spot in this broad country, at least, is awake to the idea that it is not only necessary to make roads good, but to keep them so after they are made. A road, like a pair of boots or shoes, will wear out by constant use, and it needs the same kind of attention to be kept in good repair that is given to railroads by section gangs employed for that purpose. And, in line with this article, nothing is more wearing and destructive to a good road than the drawing of heavy loads on narrow wheel tires.

THE Missouri State Board of Agriculture, besides publishing a regular edition of 20,000 copies of its annual report, has printed a special edition of pamphlets containing that

portion of the annual work which refers to the roads of that state. We are informed by Secretary Chubbuck of the State Board that the twenty-fourth annual report, now in course of preparation, will give the roads subject the most conspicuous place. Secretary Chubbuck writes: "Public opinion in Missouri is rapidly crystallizing in favor of good roads, and we are very anxious to do all we can through our reports and otherwise, to help on the good work. I should like to get some stereopticons of good and bad roads to use in connection with illustrated lectures on roads. We are arranging for a state road convention to be held this coming summer, one feature of which will be addresses and lectures on roads, another will be the construction of sections of roads by experts, as an illustration of correct road building. The convention will probably be held in August, and at some good railroad town not yet determined."

"An examination of the town accounts for the past six years shows an expenditure of \$64,324.11, an average of \$10,620 yearly for surveyor's bills alone. And this sum does not include the item of 'miscellaneous highway bills,' which, for the same years, amounted to \$29,697.47, a total of over \$94,000 in six years. I do not cite those figures to criticise the surveyors or cast any reflections on their integrity. As a class, they are among our best citizens. It is the fault of the system and the absence of a responsible head. I am firmly of the opinion that the methods of working the streets and highways can be improved, and though the city may spend no less money on them in the future than in the past, the people can have more to show for it.

"This matter of good streets and highways I consider of great importance to the future prosperity of the city, and have dwelt longer upon it than I otherwise should, in view of the radical change from the old methods of repairing and improving highways and streets which the city is about to adopt."—*Inaugural Address of Mayor Whitehouse, of Rochester, N. Y.*

ON Thursday and Friday, April 7th and 8th, an important farmers' institute meeting will be held at Torentum, Pa., under the auspices of the State Board of Agriculture and a prominent feature of the meeting will be a discussion of the movement for improved roads in that State. Honorable William H. McCullough, resident member of

the State Board, and a zealous advocate of the cause for better roads, will supervise the meeting.

MOST of the hustling cycle clubs, in the matter of roads improvement, seem to locate in the western districts. One of these clubs, by its secretary, writes us that they are in a fair way to secure the passage of a law directing the various county recorders to certify annually to the Auditor of the State, full particulars showing mileage, quality, cost and condition of the roads in their respective counties. Such a report would be of infinite value in opening the eyes of the farmers to the actual expense now sustained by them in maintaining a kind of public road that is worse than useless for ten weeks every year. Our correspondent in this case, writes us that the repairs are so miserably made that the road officers are compelled to put up rails on each side of the roadway to compel the farmers to drive on the portions that have been "repaired." A public officer who will turn over to public use a highway in that condition, is on a par with the man whom we send to State prison for passing counterfeit money.

CHIEF CONSUL GEROULD of Illinois is a born statesman. He has brought his Division into prominence as the leading body of road improvement agitators in Illinois, and his recognized ability and zeal have gained him a place in the hearts of League members far beyond the limits of his own State. Not forgetful of the need of co-operation between the State Divisions and the National body of the League, he has sent out a circular letter to all members of his Division from which we quote the following:

"I send you by mail some subscription blanks for the new monthly magazine, GOOD ROADS, now being published by the Road Improvement Bureau of the League. * * If you can not take it up, will you endeavor to get one or more persons in your vicinity to do the work? All merchants, farmers, business men, and good citizens, if properly approached, would, I believe, gladly subscribe for the magazine at \$2.00 per year, and thus help the grand cause of improvement of the highways."

We commend this work of Chief Consul Gerould to the attention of some of our brothers in other states, whose ability might well be supplemented by a little zeal in the same direction.

WHAT MAKES THE MARE GO.

TONS OF PRINTED MATTER are sent out from the L. A. W. Roads Improvement Bureau every month. It is doing a wonderful work and exciting a wide interest both at home and abroad.

WHO PAYS THE EXPENSES?—a question often asked; and here is the answer :

1. *The League of American Wheelmen* guarantees a fund of \$6,000.
2. *The Friends of the Movement* have guaranteed an additional fund. For example, here is

A \$4,000 LETTER.

POPE MANUFACTURING COMPANY,
COLUMBIA BICYCLES,
77 Franklin Street,

ISAAC B. POTTER, Esq.

BOSTON, MASS., Dec. 8, 1891.

DEAR SIR : I congratulate you that the Road Improvement Bureau is to be put on a sound basis and that you have consented to take charge of the new magazine. I had a very pleasant call from Maj. Burdett, and at once settled the matter of my \$4,000 guarantee, which will make up (with the League's \$6,000), the sum of \$10,000. . . . You have my best wishes.

ALBERT A. POPE, *President*.

And here is

A \$6,000 LETTER

OVERMAN WHEEL CO.
MAKERS OF VICTOR BICYCLES,
Chicopee Falls, Mass.

ISAAC B. POTTER, Managing Editor,
NEW YORK, N. Y.

April 1, 1892.

DEAR SIR : I have considered the matter of road improvements in the lines indicated by your publications, and am much pleased with the progress you have made. We want to lend a hand in this work, and we will stand ready to pay \$6,000, or any part thereof, provided you find that your income for the present year is insufficient to meet your demands, and will require no further documents in the case than for you personally to say to us that the money is needed.

Very truly yours,

A. H. OVERMAN, *President*.

To further aid the Bureau, the **GEORGE R. BIDWELL CYCLE COMPANY**, without solicitation, has subscribed the sum of **\$1,000**, payable one third in each year for three years.

These contributions have been made freely by public spirited and liberal men, who believe in this work of the league and are anxious to uphold it.

WHO SHOULD PAY THE EXPENSES ?

Another pertinent question, and here is the answer :

1. Every person having a *pecuniary* interest in the improvement of roads should aid the cause. It is unfair and unmanly to accept as a gratuity the benefits of another's work. And by this we mean that all manufacturers of cycles and other vehicles should support the Bureau, either as subscribers or as advertisers.

2. Every reader should aid the cause. How ? By obtaining paid subscription, and by patronizing our advertisers. They are all good men, and have the first claim upon your patronage.

3. Every dealer in road machines, drain tile and sewer pipe ; every civil engineer, road maker, county and town officer, and every citizen, should either contribute, subscribe or advertise. Our work is growing, expenses increasing, and its splendid success depends on *co-operation*. Let us all pull together.

We need a fund of \$50,000 for future work. Our books are open to all our friends. Come and see us.

I. B. POTTER, Manager,
POTTER BUILDING, NEW YORK CITY.

QUERIES AND ANSWERS

"ANSON M."—The article by Senator Dolph in March number was written for GOOD ROADS. When extracts are made from other publications we always aim to give due credit.

"M. BROS."—The use of wood pavements is in no sense confined to this country. They have been used for many years and under great variety of systems in the cities of Europe. There is some difference of opinion as to their efficacy and lasting qualities but it is fairly conceded that good results cannot be insured in the use of wood pavements, except by using carefully selected materials placed upon good foundation and laid with scrupulous care. Most of the works on street pavements treat fully of this subject.

QUARRY.—Trap rock is largely used in the construction of macadam and telford roads, and in localities where it is found in large quantities, is often required by the specifications for construction work. It is often found in large masses, having flat upper surface which rise above each other like steps, and hence the term "trap rock," which comes from the Swedish word *trappa* or stair. Trap rock is closely allied to granite, being composed of feldspar, augite and hornblend. Basalt, greenstone, whinstone, dolorite and greywacke all belong to the general class of trap rocks, and are distinct from each other only in the proportion and conditions of their ingredients. You cannot judge of the wearing qualities of any given stone merely from its name, because some varieties of granite will resist abrasion much better than others, and the same is true of sand stones, lime stones and other varieties. You can get valuable information from almost any elementary work on these points; but a practical knowledge can only be had from experience and experiment.

"T. F."—Trautwine's civil engineer's pocket book is, perhaps, the best work for your purpose that we can recommend. It

contains, in a reasonably condensed form, a great mass of practical information that is of value to engineers, contractors and other persons interested in public work. It does not deal largely with the higher mathematics, is easily understood, and covers a considerable variety of subjects. You can obtain it of the publishers, John Wiley & Sons, 53 East Tenth street, this city, or at this office. Price is \$5.

"EDGEMOOR."—Dynamite, "giant powder" and similar compounds, all depend upon nitro-glycerine for their high explosive quality, and only a few of them contain less than fifty per cent. of nitro-glycerine, the rest of their substance being wood pulp, resin, "chieslguhr," etc., with some carbonate of magnesia and other ingredients, as determined by the fancy of the manufacturer. List prices run from sixteen to thirty-five cents per pound. They are safer than nitro-glycerine, but need to be carefully guarded and handled. We can not give you more extended information here.

"S. M."—A thirty-foot roadway is much too wide for your purpose. Few country districts can afford to maintain a roadway of this width, for besides being greater in first cost, it is more difficult to drain and more expensive to keep in repair. Sixteen to eighteen feet will be ample for your width of roadway under the conditions you name. You will find further information in the article "Dirt Roads and Gravel Roads," appearing in this number.

"MISSOURI."—Apply at the offices of your town and county assessors and examine also the records and books of your road officers. These will give you information regarding the total amount of taxes collected for road purposes in your vicinity and from these you can make your estimates. As soon as you are well along in this work, write us again and we will try to advise you further. Send statement of your computation.

POPULAR OPINION

"I WILL send you by Monday's mail draft for \$100 and list of 100 subscribers at club rates for GOOD ROADS."—*J. H. Stout, Knapp, Stout & Co. Company, Menomonie, Wis.*

"I WILL undertake to send you a corrected list of the members of the National Board of Trade when I can take time to get it properly transcribed. I send you copy of a Carbonale paper containing report of an address recently delivered, and you will readily observe that I am entirely in harmony with the work you are doing. If it is your desire I shall be very glad to contribute as I can to the good work. I have traveled much in various parts of the world, both civilized and uncivilized; and my note-books are full of observations on roads and streets. I make this suggestion only with the possibility that my contribution might help. Please so regard it, and only so."—*J. A. Price, President, National Board of Trade, Scranton, Pa.*

"We forward you to-day 200 copies of an address made before the Sangamon County Farmers' Institute at this place by Dr. A. L. Converse, one of the wealthiest, brightest and most influential of our practical farmers. * * * Can you not send us at least 100 additional copies of 'The Gospel of Good Roads?' There is a great demand for it here and we could dispose of that number without any difficulty."—*A. A. Billingsley and J. J. Amos, Springfield, Ill.*

"My Local Consul at Tyrone, Pa., has just had a well attended meeting of the farmers of his county and I sent him some copies of 'The Gospel of Good Roads' and 'Roads Improvement,' to be distributed. He reports to me that there was a good deal of interest displayed and an eager demand for our pamphlets. They want more and I am appealed to send them. Can you spare me fifty or a hundred more of each for this and other cases? I think the seed is fructifying in Tyrone's County—Blair."—*S. A. Boyle, Chief Consul, Philadelphia, Pa.*

"GOOD ROADS is a most needful and advantageous publication for farmers. 'Hubmire' is worthy of Dickens. Please find enclosed check for \$2 for one year's subscription, beginning with March number."—*Leavitt Hunt, Weathersfield, Vt.*

"I SEND you copy of my book 'The Bicycle, its Selection, Riding and Care.' Please accept this as a small compliment to you for your splendid efforts in American road improvement."—*T. F. Korns, Chicago, Ill.*

"I AM greatly interested in the subject of better roads in New York State, and think your monthly periodical will be a great help in bringing about the results for which we are all looking. * * * The articles appearing in GOOD ROADS have all been interesting and practical, and ought to have a larger circulation than they do."—*S. Mitchel Rainey, Hudson, N. Y.*

"AM much interested in this subject for Texas, and should like to be put on your mail list for any other information you can furnish from time to time, and I should be glad to aid you if in my power to do so. I enclose five cents in stamps as requested. If consistent or advisable would form a club here to co-operate with your committee. Shall be very glad to get the pamphlets and to hear from you with commands or suggestions."—*C. T. Daugherty, P. M., Denison, Texas.*

"I HAVE been referred to you by G. E. Johnson, Chief Consul of Kentucky, to obtain sample copies of GOOD ROADS. Am a civil engineer and take interest in seeing that such progress is made in the beginning of the making of good roads. Mr. Johnson has sent me a copy of 'The Gospel of Good Roads,' and I wish to obtain the following and be in condition to obtain future publications: 1. 'Roads Improvement.' 2. (I have). 3. 'Macadam and Telford Roads' (in press). 4. 'Dirt Roads and Gravel Road,' (in preparation)."—*James F. Parr, Cumberland Gap, Tenn.*

"IN this connection I beg to say that ordinance has been passed by the City Council of this place, and contract will soon be let for paving Broadway of this town with vitrified fire-brick. Two years since Main street, about two miles long, was paved with fire-brick; last year Third street, about one-half mile long, was paved; this year, it is rumored, that several more streets aggregating possibly two miles, using in every case, the Ohio Valley fire-brick. The following towns in this valley are paved more or less extensively with this material, viz: East Liverpool, having about 12,000 inhabitants; Wellsville, about 8,000 inhabitants; Toronto, about 4,000; Steubenville, about 18,000 inhabitants; Martin's Ferry, about 5,000; Bridgeport, about 4,000; Bellaire, about 11,000 and Wheeling, about 40,000. I enclose a clipping from *The Cleveland World* of last night, which may be of interest, coming as it does from one of the leading journals of the best city of our state."—*S. C. Moore, Wellsville, Ohio.*

"We are taking up the question of hard roads and in no section are the roads worse. We have a copy of March GOOD ROADS. I wish to get GOOD ROADS into the hands of our membership. Have you not some small sheets of printed matter in the form of prospectus as to what you expect to do in GOOD ROADS—which I can place with each of our members? I am not working for a prize, but to arouse and sustain an interest in this important question. What can you do in the case or advise in the matter?"—*O. L. F. Browne, Des Moines, Iowa.*

"We are interested in the good work of better roads in this country, and will do all we can to encourage it. When we receive the magazine we will take pleasure in quoting from its pages anything that will be adaptable to our readers and a stimulant to the improvement of the public roads."—*C. L. MacArthur & Son, Northern Budget, Troy, N. Y.*

"THANKS for yours of 1st instant, and the possibility of our getting some of your circulars to be mailed at Fieldhome. I send you under another cover a marked issue of the *Democrat*, giving the results of the last election. I am delighted that I have been sustained in the contract system of road-making. I have found the supervisors much more useful in stirring up the road subject than the highway commissioners, one of whom I told in public that all the work I had ever heard of his doing was sitting on the fence adjoining a bad piece of road, smoking a pipe and charging for his time. The people seemed to think about the same thing and he has never been re-elected, though rich and influential. I feel the disgrace of our roads, but the people will not apparently help at all, and all I can do is to keep pegging away as far as my income will allow, hoping that the sample I can give will by-and-by awaken those who really should be more interested than I."—*C. deP. Field, New York City.*

"I AM a reader and much interested in GOOD ROADS, and will do all I can for the good of the cause. Reading your 'Wanted' in March number, I send enclosed list."—*H. J. Daniels, Local Consul, Warwick, N. Y.*

"I AM deeply interested in your work and hope we may soon be able to rejoice that we have as good a system of country roads as our French friends. * * * Mr. E. E. Palmer is an enterprising young newsdealer, and thinks he would be able to secure a few subscriptions."—*F. E. Norton, Warsaw, N. Y.*

"You are engaged in a good work, one that the editor of this journal is in full sympathy with. Will you kindly send us the March number as soon as issued? The one that we received was for February. Yours truly."—*M. T. Richardson, New York City.*

"ENCLOSED find four cents in stamps to pay for 'Gospel of Good Roads' and 'Roads Improvement' pamphlet. In this town, just at present, it is a question which is the best means of travel, a skiff, a stone boat or a land roller, with a high seat. A wheeled vehicle is about out of the question."—*Seth Bottomley, Nashville Center, Minn.*

"You have a wide field of usefulness and from your initial number we think you are fully equal to it. Wishing you a full measure of success, we remain, yours truly."—*George B. James, The American Cultivator, Boston, Mass.*

"ACROSS the river in Virginia the roads are in a fearful condition. Within a week I have seen wagons in from the country whose wheels were so loaded down with encrusted mud that the position of the spokes could scarcely be located. I wished for a Kodak to snap pictures for you."—*Asa P. Dunlap, Washington, D. C.*

"ENCLOSED find check for \$3 for which send me GOOD ROADS one year. For the extra dollar send me as many copies of the January number by mail as you can afford to and I will see that they are judiciously distributed, and perhaps in their distribution you will get some subscribers. I will mail you a list of names and post-office

addresses of each town highway commissioner in this county."—*M. A. Leonard, Bangor, Maine.*

"I FIND that the Tennessean is very willing to take hold and follow every reasonable effort of one who leads any movement for good roads. The City of Knoxville, in this state, has a few very good avenues leading towards it, made of crushed limestone, and has appropriated something over \$150,000 for the building of eleven turnpikes in the manner of spokes from the hub. This is one of the strongest road movements that I have discovered in this section of the country. Wheelmen, as yet, right here have very little show, as the roads are too rough and are about as tough as they can be found anywhere. For some time I have noticed your good work and congratulate you upon the results that are now appearing. Will you kindly give some information as to the prices of the various publications of the league, as I desire to make use of them."—*George H. Freeman, Harriman, Tenn.*

"I HAVE just completed a list of the people in this end of the county, and thus have some 1,000 or 2,000 names, and if you desire to send out circulars I should be very glad to take them at my home 21 East Twenty-sixth street, or office 127 and 129 Water street, bring them up, have them directed and mailed here if it would save you trouble, and I am not sure I could not afford to pay part of the postage to get postmark on them."—*C. deP. Field.*

"THE people here are beginning to learn the advantages of concrete foundations, and, for the main streets and avenues, have petitioned for paving on concrete always * * * Metalthic (similar to Granolithic) sidewalks are largely used."—*Harvey Linton, City Engineer, Altoona, Pa.*

"I HAVE received your GOOD ROADS, and can assure you that it is excellent reading and fills the bill to a 'T.' I mail you a list of our county supervisors and street commissioners. I have taken an active part in the furtherance of the good roads movement by frequently publishing in my paper, *The Journal*, excerpts from your excellent magazine. With hopes for the ultimate success of our mutual object, I am, most sincerely yours, *Charles H. Van Deusen, Hudson, N. Y.*"

"I HAVE presented both my copies of GOOD ROADS to the Mechanics Institute here, and requested the librarian to place them in the reading room, which he has promised to do. The object of GOOD ROADS is excellent, and the more public attention is drawn to it, the better."—*T. F. Trenor, San Francisco, Cal.*

"THE movement in favor of good roads is becoming quite general here; the township of Upper Darby, Springfield and Nether Providence having, by a vote of the citizens, authorized the borrowing of \$150,000, \$80,000 and \$65,000 in the order named, for the purpose of building macadam and telford roads. Wishing you God speed in your endeavor in behalf of civilized roadways, I herewith enclose the names and addresses of gentlemen who are interested in the good work in this country, trusting they may be the means of adding many names to the list of subscribers to your excellent publication."—*E. W. Smith, Editor The Morning Chronicle, Morton, Pa.*

CONTRACT NOTES.

NEW YORK.—Hornellsville, N. Y., by its President, R. K. Faulkner and its Secretary, C. R. Wescott, is advertising for sealed proposals for the construction of about twenty miles of sewers, having diameters running from eight inch pipe to forty-two inch brick, with manholes, basins, inlets and appurtenances. Plans, sections, blanks and specifications may be seen at the office of the commission at Hornellsville, or by applying to Carrol Ph. Bassett, engineer in charge, Orange, N. J.

Clinton.—Plans for the proposed system of sewers have been completed, and when approved by the State Board of Health, will be submitted to a vote of the citizens.

Cortland.—A public meeting will soon be called to discuss the subject of constructing a system of sewers throughout the town.

New York City.—Thomas F. Gilroy, Commissioner of Public Works, is inviting bids for street improvement and sewer contracts. A list of streets to be paved with the special appropriation of \$1,500,000 has been submitted by the Commissioner of Public Works. It includes asphalt on the present stone and granite blocks on concrete.

Dunkirk.—It is expected that a large amount of brick paving and macadamizing will be done during the year. F. A. Dunham, City Engineer.

THE Court of appeals has affirmed the legality of the resolution passed by the Board of Supervisors of Queens County, providing for the bonding of the town of Jamaica for the sum of \$400,000 for macadamizing the important roads in that vicinity.

A BILL has been introduced at Albany providing for a large increase of annual appropriation for the purpose of highway improvement in the town of Flatbush in the County of Kings.

ILLINOIS.—Three committees representing, respectively, the City Council of Danville, the Board of Supervisors of Vermilion County, and the Highway Commissioners of the town of Danville, have united in a call for sealed proposals for all work and materials in the substructure and superstructure of an iron highway bridge across the Vermilion River at Danville. There are to be two deck spans of 270 feet each and 520 feet of iron trestle approach. The roadway is to be twenty feet in the clear with timber wheel guard in the centre and sidewalks on each side having width of six feet each. Each bidder must submit general plans, complete strain sheets, and detail drawings showing dimensions and areas of the different parts.

The piers and pedestals are to be of first-class masonry laid in good cement mortar, and the stone must be as good in quality as the Independence, Indiana, stone. Courses shall be not less than fourteen inches thick. Other particulars stated at length together with profile drawing of the bridge site may be had on application to the town clerk, address at Danville, Ill.

OHIO.—At Columbus the Board of Public Works has recommended the paving of one street each with heyden blocks, hallwood blocks, and cobblestones.

Toledo.—The Warren-Scharf Asphalt Co. made the lowest bid for paving Fifteenth street with Trinidad asphalt. It was \$22,791 with Medina curb or \$22,458 with Berea curb. Thomas McKinney bid \$17,790, and

\$17,293 with Medina stone paving, and \$13,469 and \$12,972 with fire-brick paving.

THE Board of Administration of Cincinnati asks bids in addition to those previously mentioned for paving several streets with granite block. A similar request is made by the county auditor for improving the roads in the township of Columbia.

Franklin County is advertising for bids for the construction of a 140 foot through Pratt truss bridge with inclined end posts. The height of the truss will be twenty-four feet, centre to centre of pins; twenty-eight feet roadway and two six foot sidewalks. The county auditor is Henry J. Caren.

MAINE.—Proposals will soon be invited for the construction of a timber highway bridge 500 feet long, over Cape Neddick River, York Beach, Maine. Particulars may be had by applying to H. E. Evans, York Village, Maine, or C. C. Van Meule, engineer, 71 Broadway, New York City.

Mayor Thompson of Belfast is urging the extension of the sewage system of that city.

MASSACHUSETTS.—The committee on sewers of the City of Lawrence has recommended the placing of sewers in three additional streets.

Pittsfield.—The bids recently received for cement for the sewer work of Pittsfield have been rejected. The City of Brockton is making preparations to enlarge and extend its sewers.

Natick.—The committee on sewers has reported in favor of the filtration system at an estimated cost of \$105,000.

H. C. Eyre of Chester, Penn., has taken the contract to build about eleven miles of sewers in Pittsfield at a cost of \$93,000.

Westfield.—The extension of sewers on the north side of the river for a distance of about 7,000 feet has been planned, at a cost of about \$23,000.

Westboro.—A sewerage commission has been newly appointed and upon organizing, W. T. Forbes was elected chairman and J. S. Nason clerk.

Westfield.—It is estimated by the selectmen, that it will cost \$30,000 to pave Elm street with granite blocks.

Worcester.—Bids are asked for 12,700 square yards of brick paving, 8,000 square yards of gutter and cross-walk cobble paving, 18,500 lineal feet of curbstone, 14,000 square yards of block paving flagstones, etc. The highway commissioner is L. B. Stone.

RHODE ISLAND.—Providence.—It is estimated that the expense of Elmwood avenue, which is to be eighty feet wide, will be \$18,000.

NEW JERSEY.—Hackensack.—Bids are asked by the Improvement Commission for macadamizing 25,000 feet of streets.

Middlesex County will issue \$100,000 of bonds to provide for building new bridges.

PENNSYLVANIA.—The Butler street, Pittsburgh, sewer extension is estimated to cost \$81,742, and a similar extension for Haight street is estimated at \$51,275.

A meeting was recently held at Black Rock and the taxpayers determined to call a vote of the township on the question of issuing \$50,000 in bonds for building a system of macadamized roads.

BORROWED WIT



SCRAPS.

A pleasant young lad had a knife,
Whose pitch was as sharp as a knife:
So shrill was its shriek
That he "busted" his chick—
And his neighbors are weary of knife.

REFLECTIONS OF THE GOAT.

How doth the busy little girl, Improve
each passing hour, By chewing slabs of tulu
gum, With all her jawful power.

How cunningly she wads it up; How
quickly she turns it o'er; Shifts it from port
to starboard; Then she chews it more and
more.

Who taught the little girl the way to work
her busy chin? Who showed her how to
twist her jaws, Such weird grimaces in?

Who taught her deft prehensile tongue
The lasso's work to do? To corral the elusive
gum, And chew, and chew, and chew?

Ah me, she learned the art at school, Mat-
riculation day, And hadn't learned a great
deal more, What time she came away.

Then let us all, with heart and will, Keep
gum on hand to chew, And find some occu-
pation still, For idle jaws to do.—*Ladies' Home
Journal.*

OMENE, the beautiful barefooted dancer
who dazzled New York audiences for a short
period last season, and was now under arrest
for larceny preferred by an ex-lover, declares
that her troubles are all due to the jealousy of
her admirers. With the most voluptuously
bewitching shrug in the world, Omene says:

"I do not care for dese men zat mek ze
trouble for me. Men haf loafed me, and zen
zey haf gone mad wiss ze jealousy. I do not
care for zem any more."

GREAT IMPROVEMENTS.

"We are going to accommodate our pas-
sengers better," said the president of a street
car line to a reporter.

"Going to put on more cars, I suppose?"

"No; we are going to hang four more
straps in each car."—*Jury.*

A GUIDE BOOK TO THE STAGE.

When an actress makes a dab at her right
eye with the middle finger of her right hand,
followed by a show of throwing something
into space, and then repeats this performance
with respect to her left eye, it signifies that
she is indulging in tears.

When an actor writes a letter, he does it
with a rapidity which causes the most expert
of stenographers to turn green with envy.

When an actor opens a letter he invariably
gives the unfolded sheet a smart slap with
the back of his hand. He does this for the
good and sufficient reason that all actors
have done this since time immemorial.

When an actress has something particular
to confide to her papa or mamma, it would
be the height of ill manners did she not
crouch down on the floor by the side of her
parent.

When an actor enters into confidential con-
versation with another actor, it is the proper
thing for him to hang his leg over the back
of a chair, with his foot resting in its seat.—
Exchange.

BREATH.

The following composition by a twelve-
year-old English schoolboy was the cause of
his being recommended to take a special
course in physiology the next term. The
theme given him was "Breath:"

"Breath is made of air. We breathe al-
ways with our lungs, and sometimes with
our livers, except at night, when our breath
keeps life going through our noses while we
are asleep. If it wasn't for our breath we
should die whenever we slept.

"Boys that stay in a room all day should
not breathe; they should wait till they get
out-doors. For a lot of boys staying in a
room make carbonicide. And carbonicide is
more poisonous than mad dogs, though not
just the same way. It does not bite, but
that's no matter as long as it kills you."—
The Youth's Companion.

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GOOD ROADS

VOL. 1.

MAY, 1892.

NO. 5.

An illustrated monthly
magazine devoted to
the improvement
of the public roads
and streets



"Our Western World, ambitious to be thought the highest exponent of advanced civilization, is still content with roads that to Europeans seem a burlesque on the name."

Hon. Clem. Studebaker.

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ISAAC B. POTTER

Managing Editor

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GOOD ROADS.

Vol. I.

May, 1892.

No. 5.

THE ROADS OF OHIO.

By J. M. H. Frederick, Editor "American Farm News."

IT is possible that, as has been repeatedly said, there are no worse country roads than those of New York, Pennsylvania and other Eastern States. However this may be, it is certainly true that if there are any which are worse than the farmers of most of the counties of Ohio are acquainted with, it



J. M. H. FREDERICK.

will be a difficult task to make the average Buckeye believe it. Indeed, it would be quite as discouraging an undertaking as to try to induce him to believe that the conservative countries of Europe (which, with more zeal than wisdom, we have sometimes claimed to lead in all things), have tens of thousands, and some of them hundreds of thousands of miles of excellent stone roads, almost as durable as the hills, and nearly as smooth and clean as the kitchen floor of the Ohio farm-house. Our farmers can

scarcely conceive of worse roads than their own, and that any road can be free from mud and dust throughout the whole year is to most of them incredible. Many, however, are beginning to see, though it may be as through a glass, darkly. A few counties have built good roads,—not such as those of France and Italy, to be sure, but very good roads for all that, when considered as local improvements, and when compared to the roads of neighboring counties. This demonstration, in a small way, of what can be done is begetting an increasing desire on the part of Ohio people, in cities as well as in the country, for better roads. But

how to get them? That's the important question. The cost of good roads has been to our people an apparently insurmountable obstacle; they never seeming to realize the fact that the cost of the roads in their present wretched state is a far greater burden than the building and maintenance of the best possible stone pikes could be. An intelligent farmer stated to me recently that the expense which he had put on the roads in the last twenty-five years, in the way of "working out" his road and poll taxes, had amounted to more than his rightful share would have been in the building of first-class macadamized roads throughout his county; and to-day the public highways are "not one whit better" than they were a quarter of a century ago.

Let me give a few figures as to the cost of good roads. I will take, for the sake of convenience, a county which represents a fair average of all the counties of the State as respects its mileage of important roads. The county to which I have reference has about 230 miles of such highways, which, if properly built of stone, would make its country districts a veritable paradise. Considering that an excellent road can be built for \$5,000 a mile, the aggregate cost for the entire 230 miles would be \$1,150,000. The average amount of property for each county, as shown by the tax duplicate for 1891, was \$19,934,060. Were this tax of \$1,150,000 to be paid at once it would necessitate an assessment of 6 7-10 per cent., or \$67 on every \$1,000 worth of property as returned for taxation. Now, dividing this into ten equal payments, the annual tax which the property owner would have to pay on every \$1,000 of assessed valuation would be \$6.70. But it is to be noted that this does not represent just so much extra tax. In 1891 the taxes levied in Ohio for road and bridge purposes were within a few thousand of \$3,000,000, and the poll tax of the State amounted to in the neighborhood of \$1,000,000, making the total tax of the State for road "patch work" for one year about \$4,000,000, or \$2.20 for every \$1,000 of assessed valuation. Thus the cost of the transition from temporary *working* to the temporary *building* of roads would be the payment, for a period of ten years, of \$3 where \$1 is now paid.

And what would this mean? It would be difficult to enumerate all the good points which suggest themselves. It would mean, instead of expending vast sums of money for a period of ten



OHIO MUD. VIEW OF WAYNE STREET, DEFIANCE, OHIO. POPULATION 10,000. FROM PHOTOGRAPH TAKEN MARCH 30, 1892.

years, and at the expiration of that time not having any better roads than now, that by reasonable extra expense for only a few years we would be able to build a magnificent system of pike roads.

The history of communities which have built permanently good roads is that it is seldom, if indeed ever, that the value of adjacent real estate is not doubled, and frequently it is much more than doubled. Thus, a farm now worth \$1,000, which pays \$2.20 a year tribute to our barbarous system of road-making by the "working out" process, by the addition of \$4.50 would be able to add at least another \$1,000 to its value. "Yes," says

the doubter, "that's all very fine talk and figures out beautifully, but when it comes to realization I fear you will find it different." To this I desire to say: Do not take the figures as ultimate. Inquire for yourselves of communities which now have good roads and determine for your own satisfaction.

Now this is all that it would mean. It would enable two horses to do easily the work for which it is now found necessary to keep three or more. This extra outlay on the highways would thus save annually \$6 interest on the investment in a \$100 horse, a tax of \$1 on him and \$50 worth of feed and care. Besides this the expense of keeping the other horses would be materially reduced.

I know a one-mile stretch of road just outside the limits of a city of 30,000 inhabitants which in its worst condition requires a strong team with a light milk wagon from forty-five minutes to an hour to travel. In Summer, when the roads are in fair condition, the same team can travel this distance easily in ten minutes. Here is plainly a loss of from thirty-five to fifty minutes in the travel of a mile of bad roads which would be a clear saving if the roads were as good as they should be. But what do these few minutes amount to? you ask. Well, reduced to facts and figures they amount to this: Time is money. Three dollars a day of ten hours is not a high estimate of the value of a team, wagon and man. This would mean thirty cents an hour or seventeen and one-half cents per thirty-five minutes. This is the toll charged at certain seasons of the year for the use of a mile of the worst roads; the price paid for the most exasperating of experiences. The man who travels with his team twice a day through two miles of such road pays, in the way of time, seventy cents for the round trip. In addition to this the extra vital energy expended by the poor horses means extra oats, corn and hay which would be readily convertible into money but for the roads which are impassable to loaded wagons. The "wear and tear" of vehicles and harness are likewise important items of expense incidental to the "dirt-mixing" so-called system of roads. What is lost by reason of the inability of the farmer to sell his products when markets are highest (and the inability of the merchant to dispose of his wares in season) is a matter for conjecture. Suffice it to say that the losses due to this cause are very great.

It would be possible to recite at much greater length items



OHIO MUD. SCENE AT CORNER OF GORMAN AND PERRY STREETS, DEFIANCE, OHIO, MARCH 20, 1892. FROM A PHOTOGRAPH.

showing the poor economy of bad roads and the discomforts arising from them; but I will content myself with the additional mere mention of the influence upon one's good temper, without which life is scarcely worth living. A bad temper disqualifies a person for successful effort, and is consequently an enemy of thrift. I know of nothing more conducive to ill temper than to force a man to plod along at a "snail's gait" through roads of uncertain depth, possibly being compelled to mend a broken harness or right a disabled wagon in mud almost "up to his knees," and then to care for a team plastered over with a disgusting paste of mud. If the reader thinks he knows of anything which tries the patience of men more, and yet has never had a thorough experience with mud roads in their worst condition, let him reserve his judgment until he has thoroughly tried the mire of what I may call our "home made" country roads in their mudiest season.

I have said this much mainly for the benefit of the people in those Ohio communities who have nothing answering the de-

scription of good roads. There are some counties in the State, however, whose citizens need little or nothing of such a lecture. They have delightful country highways, and nothing could induce them to allow their roads to go to ruin, or to return to the old dirt roads over, or rather *through*, which they were once wont to travel.

From Toledo east, and north of Tiffin, there is a liberal amount of plank pikes; but as a rule they are in a very bad condition. From here south to Columbus, with the exception of a half-dozen counties, the roads are the worst imaginable. They are typical clay and loose sand roads, with hills almost insurmountable. The southwestern counties of the State are different. This section is what has been termed a "paradise of roads." Gravel and limestone pikes form the main thoroughfare. Some are made entirely of limestone, but probably the most delightful are those roads of limestone covered with a layer of an excellent quality of gravel which readily packs into a solid mass. On these the traveler knows no dust in Summer, no mud in Winter. The roads are kept in repair with comparatively little expense. This would probably not be so conspicuously true were it not for the care exercised in reducing to a minimum the racking wear of vehicles upon them. Wagons must all have at least three inch tires, and the use of rough locks on grades is strictly forbidden. The wide tire is considered a *road maker*, while the narrow tire is held to be nothing less than a *road breaker*. In addition to the roads which I have just mentioned is a national highway which begins at Marion, runs westward through Richmond, Ind., and thence southward and eastward to Washington, D. C. It is of limestone, has a wagon road twenty feet wide, and is in all respects a delight to travelers.

One of the great seeming obstacles in the way of building roads in some parts of the State is the question of securing suitable material. It is a frequent error to suppose that equally good roads with those enjoyed in certain localities must be made of exactly the same kind of material, or in exactly the same way. Interested parties from my own county have frequently made pilgrimages to counties 100 or 200 miles distant to study the roads, and have speculated upon the extra cost of having the same kind of material shipped to them for road-making purposes. Apparently they never stopped to consider seriously the feasibility of building roads of the materials nearer home, until within a

few months, when enterprising parties made the discovery that there is within our county limits abundant material of which to build excellent pikes. Distance lends enchantment to the view, and it remains to be seen whether those who have raved over the highways of Southwestern Ohio can be persuaded that good roads can be made from material which is to be found in our own hills. I believe that what is true of this one county will be found to be true of many others if their people will but look into the resources of their local territory. "Seek and ye shall find"



OHIO MUD. PICTURE OF WAGON WHEEL AT STREET CROSSING, ALLIANCE, OHIO, MARCH 29, 1892. FROM PHOTOGRAPH.

is a truth which may profitably be applied to even so common a subject as material for making roads.

In his recent inaugural address Gov. McKinley said: "The great need in many sections of Ohio is good country roads. This is a subject of importance not only to agriculturists, but affects every material interest in the State, and is receiving very general attention throughout other States in the Union. I invite the attention of the Legislature to it, with the object that some place be devised which, with the concurrence of the people, will lead

to the improvement of our public highways so that they will be serviceable in Winter as well as in Summer. Many of our country roads are almost impassable during several months of the year. They should be good the year round for the safety and convenience of travel and transportation." These remarks were quite in accord with the sentiment of the people of Ohio, and have led, I believe, to some steps looking to legislative action. One bill has been introduced in the Ohio Legislature to permit a certain township to vote on the question of issuing \$100,000 bonds for road improvement purposes. The citizens of some counties have recently held conventions and called for effective action by the Legislature in the interest of highway improvement. Besides this the members of the Legislature from the rural districts of Cuyahoga County have requested the commissioners of their county to call a convention, in which all townships shall be represented, for the purpose of considering this very important subject. To be sure, agitation of itself never built roads; but in a Republican country public highways were never built without first a liberal degree of educational agitation. It is gratifying to know that the interest manifested in this subject of late justifies hope that the mud road period in Ohio is drawing near its end.

It may be urged that the road question is not one which belongs legitimately to politics. Certain it is, it is one of which the politicians have persistently steered clear; but it can scarcely be held that this is a good reason for longer delaying its projection into this very sacred field of politics. We are now on the eve of a national election in which a new congress will be chosen. The question of a national system of highways and possibly of governmental aid to State roads, I believe, might profitably be made an important issue in the campaign of every congressional district. Much could be accomplished if the friends of good roads will present a solid front in this fight for a good system of roads. They would be too formidable to be safely ignored by any candidate. If this issue should be made in the coming congressional campaign, it would be an easy matter to carry the question successfully into the State campaign the following year, when a new legislature is to be elected. Indeed, it is quite possible that the present Legislature, once the people made themselves heard on the subject, might take

the proper measures to effect the desired results. Road improvement must come principally through legislation, and how better can it be accomplished than by at once carrying the matter into politics? It is not necessary to have the candidate of one party for improvement, and the candidate of another party pronounced in opposition to it. If possible, it would be well to have all candidates go on record as favoring adequate highway legislation. None should be permitted to stand on doubtful ground. A political issue is not necessarily a party issue. Are the friends of good roads ready to take this step?

BROAD TIRES VERSUS ROAD TAXES.

By Sterling Elliott.



HERE are differences enough between a horse and a wagon so that even a high protectionist ought never to mistake one for the other. One of the most obvious differences is that a wagon is capable of its best work only when thoroughly tired, which can hardly be said of the horse, and it has also been noticed that the horse gets more tired as the wagon isn't.

While resting my bones in the Michigan grass last Summer, I had a pleasant opportunity of listening to, and verifying, the talk of a well-informed, practical, and consequently well-to-do farmer. I noticed that the wooden wheels of his wagon had very broad tires (and by the way, I couldn't help noticing how well wood seems to answer for the wheels of farm wagons). I asked a great many questions about the broad tires, and this is what I found out.

It seems that the Michigan law makers have had their windows open so that the new light has begun to shine on them. The value of broad wheel tires being apparent and not wishing to put the farmer to compulsory expense, they have made a law the drift of which is that the man who will use on his wagon tires of a certain width shall have a rebate in his road tax of one-half. And this is how it works. In buying a new wagon the difference in cost is slight, as the wider tires may be much thinner and the added strength in the wooden rim makes a stronger wheel.

To take from a wagon already in use the narrow rims and tires and replace them with wider ones costs between \$12 and \$20, and in the case of the farmer to whom I refer, the direct saving in road tax *at once* was better than twenty-five per cent. on the cost of making the alteration. To a man who was loaning his surplus money at six or seven per cent., the broad tires looked like a good investment, even if there was no other advantage. But the other advantages were much greater. He showed me that in the cornfield thirty bushels had been a good load with narrow tires and he could now haul fifty bushels with greater ease. When it came to hauling stuff to market the load could, with wide tires, be increased from twenty-five to fifty per cent. This much from the farmer's standpoint. How about the commonwealth? It has been discovered that, in localities where a considerable portion of the inhabitants use the broad tires, the decreased tax keeps the road in better condition than the whole tax did when the narrow tires prevailed, and it is believed by men who are in a position to know that when broad tires are universally used, the highways (all kinds, from the city pavement to the poorest dirt road) may be kept in very much better condition than at present with one-fourth the present cost.

The greatest improvement for the least outlay is what the present generation is most likely to realize on, and while I thoroughly believe in all the good work now being done to the roads, I believe that no road will ever be built that can stand narrow tires under heavy loads, and to improve the road first is beginning at the wrong end of it. Legislation looking toward the forced general adoption of wheel treads proportioned to the maximum load to be carried is the thing to be first pushed. Such a law made universal would greatly improve present roads, and as fast as roads were made better, would tend to keep them so. If you were putting down a new parlor carpet you wouldn't let the boys continue to walk on it with hob-nailed shoes, would you? If you did, the carpet appropriations would begin to run short and you would have to appeal to the Legislature for aid.

There is just one valid objection to wide tires and that is, that such a wagon runs hard over a road which is mostly used by the old kind of tires, but when all wheels are what they should be there will be no ruts (at least not in the road), and the face of the farmer may yet be shortened so that he gets shaved at

the regular price. I have often heard teamsters say they would be glad to use broad tires if everyone else was compelled to do so.

This is the key to the situation. Make wrongdoing in this direction illegal, at the same time show to the wagon owner why it is directly profitable to him to comply with the law. Did you ever notice how willingly a man becomes a law-abiding citizen when he can make money by it? The money now expended for roads would come very near making them good roads if it were not for the constant abuse inflicted by narrow tires. But I do not believe it possible to ever raise money enough to keep the roads where they should be until the tire question is settled by law, and any such law which was to take effect two (or even one) years after its passage could not be a hardship to anybody.

AS IT HAPPENED.

As I upon my horse one day
 Was riding north from out the town,
 I felt so very glad and gay
 I lost all longings for renown;
 I was content to ride along
 And note the splendid scenery,
 And now and then I'd hum a song—
 A song all full of cheer to me.
 But as I kept my eyes on high,
 It seems there came a maid due south
 Upon her horse a-riding by.
 A maiden, with a pretty mouth,
 A lissome form, a graceful air,
 Like me, deep lost in reverie;
 And so we just collided there.
 I blushed, she laughed—ah, woe was me!
 But soon of riding joys we talked,
 We called it pleasure fit for kings,
 We laughed at man or maid who walked
 When they could ride—and other things.
 We broached 'mid happy moments when
 Our mutual bliss we could not hide.
 We've met upon the drive since then,
 But now we travel side by side.

By Nathan M. Levy, in "The Rider and Driver."

GOOD ROADS.

By William A. Miller.

THIS subject has at last sprung into prominence before the American public, and the necessities of the times demand its vigorous consideration. At no date in our history has there been felt so universal a desire for improvement in this



WILLIAM A. MILLER.

direction. The United States, leaping in mighty strides ahead of all other countries in great and surprising inventions and in her huge system of trans-continental railroads, has overlooked the requirements of local traffic and stepped clear of the comforts and needs of domestic communication; and in this respect we are sadly behind the countries of the Old World. It is, and ought to be, an important subject to all the people of the Republic.

Let me venture a query:
In the early part of the present

century the subject of roads received great attention in many countries, and, not least of all, in our own. Suppose that in 1817 Senator Abner Lacock had secured the construction of his proposed road from Maine to Louisiana with the proper feeders to other States—would not the enhanced means of social and industrial communication between the different sections have made our civil war less severe, if not improbable? What so binds together the interests of neighborhoods as a good wagon road? In this connection it may not be unprofitable to review some of the recorded facts concerning the famous roads of ancient and modern times.

A FEW ROADS OF HISTORY.

In the days of Shamgar, the son of Anath, in the days of Jael, the highways were unoccupied, and the travelers walked through byways.—*Judges*, v., 6.

The word "road" is from the Anglo-Saxon "rade"—a ride. It is found in the Old Testament but once—I. Sam., xxvii., 10. The Hebrews and Greeks made use of roads, but were surpassed in their development by the people of Carthage; so it is said the Carthagenians taught to the world the art of making roads. Strange to say, their strongest enemies, the Romans, profited most by the lesson, and in due time the magnificent, paved roads of the Romans connected the capital with every division of the empire. They ran to Germany, Savoy, Hungary, Provence, Macedonia, Dauphiné, Constantinople, and along the Danube, and they extended into England, Corsica, Sardinia, Sicily, Asia and Africa. At the time of Julius Cæsar the city of Rome was in communication with every large city of the empire by paved roads. These roads were constructed almost entirely for military purposes, and were well adapted to the uses of the splendid military system of their makers. Twenty-nine of these military roads extended out from the Forum, and nearly four hundred of the great highways crossed the empire, a length of about fifty-three thousand miles. Remember, these were not common roads, but were paved throughout, and were noted for their solidity; many have been in constant use for nearly two thousand years, and in that time have been often called upon to bear loads of hundreds of tons, especially in the moving of obelisks and pillars, yet without injury. Pliny, the Roman lawyer and author, speaks of the great strength of the roads and the sewers underneath. They were built on scientific principles, and were always in the care of a man of great rank.

The first of these remarkable roads was the Appian Way, constructed by Appius Claudius Caecus, the censor, 311 B. C.; and it was eventually 360 miles long, running to Brindisi. The stones were hewn and carefully fitted, and the superiority of this structure is universally conceded. Horace in his "Journey to Brundisium," about the year 37 B. C., says the causeway was "soft and fair," and that the road was "well supplied with inns commodius, snug and warm." The Roman poet Statius, of a subsequent period, named the Appian Way the *Regina Viarum*, or Queen of Roads. Strabo, the Greek geographer at the time of Christ, writes interestingly of it. Livy, the Roman historian, who died A. D. 17, states that the Appian Way was paved with lava for a good portion of its length. Plutarch in-



FAMOUS ROADS OF HISTORY.—THE APPIAN WAY, ROME.

forms us that Julius Cæsar was commissary of this road. The Appian Way was remarkable for its fine engineering, massive foundations, beautiful bridges, and an unusual straight course over deep valleys and high hills. After the rough handling of twenty centuries it remains in almost perfect condition in many places.

Of the other roads leading into Rome particular mention should be made of the Domitian Way. It was an exceedingly useful road, making a short cut through a swampy region, though constructed at great expense. This highway was peculiarly noted for its many bridges.

In the second century Rome had six great roads in Egypt. The Greek architect Isidore, sixth century, who completed the Church of St. Sophia at Constantinople, said: "The Romans make roads almost all over the world to have their marches in a straight line and to employ the people." Bede, the first English historian, A. D. 672-735, relates that the Roman roads in England were built in the second, third and fourth centuries by the people, the soldiers and the criminals. The most important of these were: Ikenild Street, from St. Davids via Birming-

ham and York to Tynemouth; Fosse Way, Cornwall to Lincoln; Watling Street, from Kent via London to Cardigan Bay; and Ermin Street, from Southampton to St. Davids. Many of these roads are now covered with the debris of centuries, while others form the foundations of some fine modern roads. Highways were first made public in England by the Romans. During the reign of Edward I. the roads were ordered to be cleared of trees within 200 feet on either side. This was intended as a safeguard against highwaymen. Toll was granted on one road in London in 1346, and parishes were made responsible for the condition of roads in 1553. The first turnpike road in England was established by law in the reign of Charles II.

Hannibal's passage of the Alps was a grand conception, boldly carried out, and in after years was ably imitated by Napoleon. The Simplon Road from Geneva to Milan, about two hundred miles, through the passes of Simplon and Mont Cenis, was constructed by Napoleon's engineers at a cost of \$3,250,000.

The roads mentioned are not the only important ones of Europe; for modern road makers have followed closely in the footsteps of their ancient exemplars and to-day that continent is blessed with an abundance of lasting and beautiful highways.

ROADS IN AMERICA.

The highways lie waste, the wayfaring man ceaseth.—*Isaiah*, xxxiii., 8.

In the Americas, to our dishonor, comparatively little has been done in the line of permanent or substantial roads. If we take the authority of such splendid writers as Humboldt, Stephens and Prescott, the ancients have the best of the road question on the Western Hemisphere. The paved ways and underground roads of the central countries surprise the modern traveler, and he can stand for hours and admire the remnants of the magnificent roads of the Incas. The two most remarkable in Peru extended from near Quito to Cuzco, one on the mountains and the other along the coast, and were paved with dark, square porphyritic rock. These roads had a width of twenty feet and a total length of about two thousand miles; the distance being marked by milestones, and some portions covered



FAMOUS ROADS OF HISTORY.—NAPOLEON'S ROAD THROUGH THE ALPS.

with a cement, making a surface not unlike our concrete and nearly as smooth as asphaltum. Prescott says: "Galleries were cut for leagues through living rock, rivers bridged and ravines filled with solid masonry."

The Uniao e Industria in Brazil, running from Petropolis, the late Emperor's residence, to Juiz de Fora, is a road that



THE CUMBERLAND ROAD.

reminds the visitor of the Simplon route. Its construction by Minister Visconde de Bom Retiro is said to have cost the Government a million dollars a mile.

In the past ninety years much has been proposed in the United States by Congress and others, but little has been

accomplished. About the only road of consequence the Government has to its credit is a portion of the old National Road from Cumberland, Md., to Wheeling, a distance of about two hundred miles, built at a cost of about \$1,700,000. Yet this is a splendid example to show the fruitfulness of the judicious placing of a good road, giving rise to a splendid system of pikes by the Government, States and private corporations, stretching from Baltimore to St. Louis and Jefferson City. This is particularly so in the States of Maryland and West Virginia. One of the best systems of artificial roads in our country is situated in the limestone region of Frederick and Hagerstown, Md. Good roads have brought prosperity to the farmers there, fences are in good repair, land well cultivated, barns and houses large, comfortable and well painted. But this is only a Tibesti in our great Sahara of mud roads.

It surely requires no argument to convince an American of the need of better accommodation and improved methods governing the common roads of the country. Our Government has felt the need of good roads as much and more than any farmer. Of what surpassing value would have been good wagon roads from Washington in the direction of Antietam and Gettysburg. Look at the millions of dollars in horses, mules, wagons and cannon, to say nothing of men, lost in the mud of Virginia! Those roads are no better at the present day. How fortunate that Sheridan had a good pike on which to make his famous ride!

Our country and State road tax system of improvement is a hideous failure—such roads never have the services of a skillful engineer, but are invariably in the care of laymen, unschooled as well as unskilled. It is an apparent fact that we shall never have roads in keeping with our civilization until their management is centered in the Government, as were all the roads of history and the splendid modern highways of Europe. Every year rivers and harbors swallow our money by the millions, yet the common roads to feed this commerce get not a cent. The roads are public property and why should not the Government improve them by the same legislative care that is bestowed upon our rivers and harbors? What is the value of vessels compared to the value of wheeled vehicles? What is the proportion of traffic on roads to that on rivers and harbors? How



THE ROAD TO WINCHESTER. SCENE OF SHERIDAN'S RIDE.

much more enduring is the work on a good road than that in a river or harbor. Here is an opportunity to increase our army in a way that will not be a burden to the people: enlist laborers and place them on the highways. Who mined the coal you have in that comfortable fire? Were those shoes of yours made in a penitentiary? We have our criminals competing with industrious classes; why are they not on the public roads for the public good? As long as time lasts man will erect costly unproductive piles to perpetuate his memory in the cemeteries; would it not be more appropriate to build a pretty memorial stone bridge and present it to a public road? Do the riders and drivers of the country ever stop to figure the extravagance of poor roads, the wear, tear (swear?) and loss of time, not to mention comfort and pleasure? How far around a man will go to get to drive a short distance on a good road! With a farmer going to town should not be a question of weather any more than it is on a railroad. He should be in a position to take advantage of any shade of the market, and not require a day to go and one to return when living but a few miles from town.

The system in general use in our country of temporary road making—piling up dirt to be washed down by the first rain—is no more than that of the Hebrews and Greeks. If it is impossible for us to approach the Romans or the Incas, can we not do as much as Carthage?

THE ROADS AND STREETS OF TRINIDAD (BRITISH WEST INDIES).

PRACTICAL SUGGESTIONS FOR ROAD MAKING BY MR. DEVENISH,
TOWN SUPERINTENDENT OF PORT OF SPAIN.



BEFORE proceeding with the repairs of the roads, an important point should be first determined, viz.: the legal breadths of the roads; such breadths to be equally measured from the center of the roadway towards the adjoining fields, except in cases where a road runs along precipices, hills, cliffs, landslips, and river or seaside, etc.

For any road used for the cartage of produce, or first-class road, forty feet should be allowed for the out-and-out width.

Of these forty feet, thirty to be between the inner sides of the trenches.

The width of the other roads of minor importance should be determined by the nature of the locality through which they may pass.

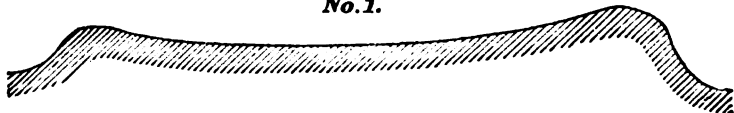
The proper width having been ascertained and determined, a space of at least four feet on each side of the road should be kept free from plantations, bush, or live fences, so as to allow to the road the full benefit of wind and sunshine.

Previous to attempting any metaling, or, in fact, any general repairs on a road, the greatest attention must be paid to its proper cross-sections and drainage.

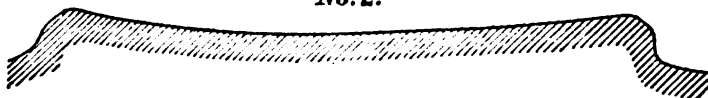
The roadway should be carefully and evenly sloped from the center to the trenches at an inclination of from three to four inches in every ten feet, as local circumstances may direct.

The general shape of the old roads which are to be brought to a true cross-section is as follows, viz. :

No. 1.



No. 2.



No. 3.



The most economical, and, in fact, often the only, mode of correcting the vicious shape of such roads when they have never been coated is:

In No. 1, by raising the lower side and forming the section with the cuttings from the higher one, thus:

No. 1.



And in Nos. 2 and 3, by filling up and raising the center with the earth taken from the sloping of the sides and digging out of the drains, thus:

No. 2.*No. 3.*

The earth thus thrown on the road should never be allowed to lie in large clods, but should be well broken and rammed down as much as possible.

It sometimes happens in case No. 1, when the road has been long metaled, that there is on the higher side almost enough metal, if not to correct entirely the section, at least to help much in doing so.

In no case, however, should a graveled road be thus brought to a true convexity with mere earth thrown on the coated surface.

In graveling roads the proper shape must then be attained by throwing the cuttings off the road and by gradually raising the lower side by repeated layers of gravel or metal.

In very low and soft places, when brush wood is at hand, the road is very advantageously raised by laying fascines or even logs of wood transversely and covering the same with at least twelve or fifteen inches of earth.

The all-important operation of drainage requires next the greatest attention on the part of those in charge of the roads.

It must generally be carried on simultaneously with the forming of the road, as the earth taken from the side channels is often the principal means of raising the bed of the road and of shaping it.

From actual experience I am of opinion that the edge of the angle of the drains with the roadway, owing to the very careless driving on our roads, should be sloped off so as not to be injured by the wheels of vehicles coming too near the drains.

When this angle is not sloped off the inner side of the drains in most of our roads is constantly destroyed, and the earth thereof tumbling into the trenches soon fills them up.

On roads where I have thus sloped the drain-slide nearly five years ago the trenches and sides of the roads are still almost as perfectly shaped as when first made, and the expense of cleaning the drains has been infinitely less than when the angle is retained.

The outer side of the trenches should be carefully sloped according to the nature of the soil.

In the clayey soil of the Naparimas the slope should never be under an angle of forty-five degrees, that is, one foot horizontal to one foot perpendicular for cuttings under two or three feet, but for a greater height, to prevent landslips, it should never be less than an angle of thirty degrees, or one and three-quarter feet horizontal to one perpendicular.

In cuttings, such as in the light sandy Tacarigua soil, a far steeper slope will do, such as one-half foot, and even one-fourth to one foot.

The depths of the side channels must, of course, depend a good deal on local conditions, but great attention should be paid not to make them unnecessarily deep, and more particularly not to give them too great a longitudinal inclination.

This is a fault often committed in the side trenches of many of our roads, principally along hill slopes, where, on the contrary, it should be most carefully avoided.

Too much inclination causes a strong current and a rush of water that soon undermines and destroys the sides of the drains and very materially damages the road.

On hilly roads, therefore, the drains ought to be dug deeper at the highest point and their depths gradually lessened in going downward, so as to correct in some measure the natural declivity of the ground.

When the road is very steep the channels are sometimes advantageously cut like steps at convenient distances in order to give them a more gentle inclination. But whenever this is done stones must be carefully hand-laid on a few feet immediately under the fall of the water to prevent it from digging and destroying the bottom of the lower drain.

Whenever a road runs along the side of a hill the greatest

care must be taken to prevent the hill water from overflowing the upper drain and running across the surface of the road.

In such cases cross underdrains made of hardwood or masonry must be established at conveniently short distances all along the hillside and their lower end carried always at least five or six feet beyond the breadth of the road.

The inlet or upper ends of such cross drains should always be protected by either hardwood posts and planks or by small wing walls, and great care taken that they are never choked with weeds, trash, or any rubbish carried by the water.

An inclination of one inch in ten feet is enough for such cross drains. Their diameter must be regulated by the locality, but in general drains two feet wide by eighteen inches deep will be found large enough.

In covered drains made of hardwood I have found it very advantageous to bore one or two rows of auger holes in the top planks and also along the sides, eight or nine inches above the bottom. These holes help a good deal in drying up the subsoil all around the cross drains.

Catchwater drains are also often indispensable on the upper side of the slope to catch the hill water and carry it into the inlets of the cross covered drains, thus preventing too great a rush of water into the upper side channels.

Small but numerous outlets, and in low, level ground larger ones, or main side drains to carry the water from the side channels to the adjoining fields, or into the natural water-courses, when near enough, should be regularly established at moderate distances along a line of road, and always kept well clear and open.

In no case whatever should the proprietors or occupiers of land along the road be allowed to drain their fields into the side channels of the roads. They should be compelled by law to bring such water into a main drain parallel to the road, and which would carry it to some lower points or to some natural water courses.

Whenever springs are met with in a road the place should be dug right down to the very spring, and a deep channel cut thence across the road and filled up with either large broken stone or logs of wood covered with a foot or eighteen inches of earth or road materials, as the case may be.

After a road shall have been well shaped and drained, and in no instance till then, the surface of the roadway must (when practicable) be coated with the best suited materials at hand.

In this colony, where, owing to the very small and inadequate amount of capital available for making and repairing our roads, it is not probable that the most approved system of road making in the mother country can be carried out, at least for many years to come, it behooves us to see in what manner we can turn our resources or means to the best possible advantage.

If the road to be graveled is an earth road (that is, never coated) or newly shaped road, the surface must first be allowed to be sufficiently rammed down, either by the traffic or with heavy "rammers," until it becomes consolidated enough to receive the gravel or metal.

When this is done the gravel or metal must then be carefully spread on a width of fifteen feet, at equal distances from the side channels, first in a layer four inches thick throughout.

After this first layer shall have been sufficiently compressed and settled (which will happen in a very few days on a road with any traffic), then a second coat of four inches again is to be laid over it, and also allowed to settle for a few days, when a third and top course, also four inches thick, will be applied to complete the work, thus giving a total depth of twelve inches to the crust of the road, or fifty-five and a half, say fifty-six, cubic yards of materials per every one hundred feet of road in length.

During this process laborers should be employed to rake the several courses as evenly as possible to prevent the formation of any ruts or holes and spreading of the materials beyond the proper width.

The foregoing thickness is particularly recommended for gravel taken from the San Fernando pits, or from the beds of rivers and ravines, but for the metal from the quarries about Port of Spain, St. Joseph or Glenroy, a thickness of eight or ten inches laid in two or three courses will, I believe, be quite sufficient if carefully applied.

When round clear pebbles are used a small proportion of chalk, marl, loam or fine gravel should be well mixed with the pebbles in order to bind them and to prevent their constant fretting and rolling against each other.

Although the process recommended above of laying three different courses will, likely, be very unpopular at first with contractors, yet I have no doubt that ere long they will find how beneficial it is for themselves by making their work much superior to that formerly done under the old system, almost without increase of expenditure, and by doing away with the unpleasant squabbling and difficulties so frequently arising before in consequence of bad work.

When broken stones are used care should be taken that their size never exceed two and a half inches. This is easily obtained by passing the metal through sieves with bars two and a half inches apart. The last or top course might be made of finer stones, but in no case whatsoever should large stones be allowed to be placed on the road.

During the metaling of any portion of a road proper measures should be taken to force the carts and carriages to pass in turn, over every part thus newly metaled. This may easily be effected by placing heaps of stones at convenient places.

Depots of gravel or metal of twenty-five cubic yards each should be established at every one-fourth mile, and special laborers constantly employed in preventing the formation of any holes, ruts, or inequalities, etc.

The best time of the year for repairing the roads is the latter end of both the dry and rainy seasons.

At the end of the dry season the cross sections should be carefully corrected, the surface scraped, regraveled and put in thorough order, the side trenches, outlets, main and catchwater drains properly cleansed, scraped and reopened wherever necessary; the bridges* and cross-covered drains overhauled, cleared and repaired; the depots of metal well filled up; the sides of the road cutlassed or, better, mowed, and, in fact, the road must be made ready to stand the effects of the heavy rains during the coming wet weather.

At the latter period the damage done during the wet season must be repaired without delay, the bridges and cross-covered drains examined and put to rights, the weak parts of the road reloaded with metal, and the road, in a word, must be again

* All wooden bridges should be made of country hardwood, and white and pitch pine at once excluded from such works.

thoroughly overhauled and prepared to stand the heavy cartage of the ensuing crop season.

The sides of the roads should be regularly cutlashed or mowed four times a year, so as to insure at the nearest possible period the growth and formation of a low and thick green sward instead of the long grass and numerous weeds of all sorts that are now spoiling the appearance of most of our roads.

As soon as the frequent use of the cutlass shall have destroyed the brush on the sides of the roads the scythe must afterwards be exclusively used.

It does a much neater and cheaper work than the cutlass, and does not so much tear up and disturb the roots of the grass.

All grass and brush cut on the roads should be carefully removed.

No mud bank, scrapings, or rubbish of any kind should be allowed to remain on the sides of the roads.

The drains must, at all times of the year, be kept free from grass and rubbish, and the parties in charge of the roads should pay great attention to prevent the constant choking up of the channels with cane trash and plants, manure, etc., as is now practiced along most of the roads running through sugar estates, particularly at the junction of private roads or cane traces with the high road.

They should also take good care that the lopping of trees and clipping of live hedges be regularly attended to as prescribed by the road ordinance.

Generally speaking, all repairs of any importance should be given out by contract, and clauses entered in the deed of contract to provide for the faithful performance of the work within a fixed period, under penalties to be guaranteed by sureties.

Perhaps the best way would be to have printed blank forms for the different sorts of contracts generally to be entered into for the repairing and keeping of the roads.

Instead of relying entirely on tenders to know what repairs will cost, as is generally if not always the case now, the parties in charge of the roads should always, previous to calling for tenders, make, or cause to be made, a careful and correct estimate of what such repairs are worth, and being thus well acquainted with the value of the work to be done should never

allow themselves to be taken in by the low figure of an ignorant contractor, but only accept of such contracts as are within a fair range and likely to prove remunerative.

Asphalting of Streets.—In regard to the results, etc., of the asphalting some of our streets I have the honor to submit the following brief notes on the matter:

1. I am of opinion that the laying of asphalt is an immense advantage over the common macadamizing, and there is every reason to believe that it will last many years at a small cost of keeping. The principal advantages are:

- a.* To be almost noiseless and offer little resistance to traction.
- b.* To be free from mud in the rainy season and from dust in the dry season.
- c.* To offer good sanitary conditions without emitting any perceptible unpleasant smell.

2. Hitherto we have used asphalt in its crude state, pulverized by hand with cast-iron rammers and applied cold on our already macadamized streets, on which it is either rammed as above or rolled by steam, and I am convinced this is quite sufficient and will answer well here, instead of having recourse to the complicated and expensive system followed in America, where the asphalt is boiled, etc., and laid at a cost of about \$4.50 per square yard. (See the interesting and exhaustive pamphlet "Genuine Trinidad Asphalt," published in Washington by the Barber Asphalt Paving Company.)

3. Of course our asphalt street work is as yet in its infancy and only an experiment, in which we must necessarily gradually gain experience, and it remains to be seen what will be the ultimate results.

4. The principal cause of complaint against it, and I believe it to be the only one (cost excepted), is its great slipperiness in streets in which, owing to the high level of our tramways, a much over-curved cross section has been unavoidable, but in other streets this complaint has scarcely ground to go upon.

5. The advantage we have here is that our streets being almost all macadamized, it only requires a scooping out of a few inches, and the ground below is generally firm and hard enough from the lower remaining macadam to receive a mere top dressing of about two to three inches of pulverized asphalt.

6. The asphalting of our streets will, in future, be much

improved from our past experience, and I have no doubt that it will give universal satisfaction and will prove a great boon to our town.

7. It is my intention to try, if allowed to do so, a small proportion of fine sand to be mixed with the asphalt, so as to render the surface a little gritty, and do away with the present sleekness to which, however, our horses are gradually getting accustomed.

8. The facility of procuring asphalt from our pitch lake at ten a ton, delivered on the wharf, is, it must be said, a great deal in our favor, whilst in Demerara the cost will necessarily be much greater.

9. On a rough calculation it takes us about three and two-third cart loads (of twelve cubic feet each) of asphalt to the ton.

10. One such load will cover about fifty square feet or 5.55 square yards from two to two and one-half inches thick.

11. The average cost of working our steam-roller is about \$5.35 per diem.

12. Hitherto the steam-roller has only been able to roll about 666 square yards daily, but more will, no doubt, be got out of it in future.

13. We calculate that it takes during ten to twelve days ten or twelve laborers daily employed in digging, pulverizing, and laying for preparing sufficient pitch for two days, steady steam-rolling.

14. One hundred square yards of asphaltting has cost us in the southern division of the town, where the traffic is very great and the streets consequently much worn out, \$37.58, whilst metal and sand would only cost about twenty dollars, or about fifty-two per cent. less, but for work not to be compared with the new coating.

15. In the northern division we have slightly asphalted, under much better conditions, 9,601.68 square yards of streets at an average cost of about twenty-five cents per yard, but with the intended improvements I believe this may probably be increased to thirty-five cents.

16. The use of asphalt is particularly of the greatest advantage in protecting the sides of the roadway and the corners of the streets, where the rush of storm water in heavy rains constantly washes away the macadam and digs deep furrows and holes.

DIRT ROADS AND GRAVEL ROADS.

A PLAIN LETTER ON A PRACTICAL SUBJECT.

By Isaac B. Potter.

V.

ROUND AND SOLE TILE—PRICES—HOW TO PROCEED WHEN GRAVEL
CANNOT BE HAD—SIDE-HILL WORK—MASONRY—TRACINGS—
EARTH-WORK—SCRAPERS—ROAD MACHINES.

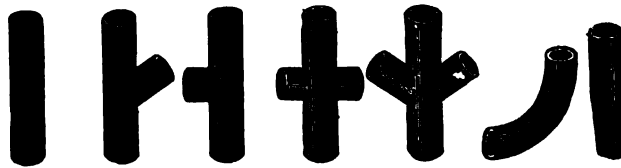


FIG. 11. DIFFERENT FORMS OF DRAIN TILE.

BEFORE leaving the subject of drainage I should like to say a further word to you on the subject of tiles. There is little doubt that the round tile is superior to other forms, since it can be turned end for end, in any situation, and may be laid on any



side of its circumference, thus facilitating the fitting of ends and insuring, as a rule, satisfactory work. The sole tile, however, is also very convenient and will answer every purpose in ordinary cases, the better forms being provided with two soles, thus permitting it to be turned end for end or upside down, and supplying every requirement of a good tile.



Collars are also supplied for round tiles whenever desired, and, although not generally necessary, they serve an important use in many cases where silt and other fine material are likely

to be washed into the interior of the pipe. The collar serves to prevent the introduction of foreign matter into the channel of the pipe and keeps it clear for the introduction and passage of



water alone. I have already given you, in our last chapter, the list price of ordinary hard-burned tile and branches. The list price for collars (exclusive of discount, which may always be counted on to a substantial degree) is as follows:

PRICE LIST OF COLLARS FOR TILE.						Lbs.
For 1½ inch Tile.....	\$7.00	per 1,000 pieces.....	weight	500		
2 " " " " " " " " " " " "	10.00	" " " " " " " " " " " "	"	1,000		
2½ " " " " " " " " " " " "	12.00	" " " " " " " " " " " "	"	1,500		
3 " " " " " " " " " " " "	15.00	" " " " " " " " " " " "	"	2,000		
4 " " " " " " " " " " " "	20.00	" " " " " " " " " " " "	"	2,500		
5 " " " " " " " " " " " "	30.00	" " " " " " " " " " " "	"	3,000		
6 " " " " " " " " " " " "	40.00	" " " " " " " " " " " "	"	3,500		

In preparing your plans you will find that in some parts of your work branch tiles must be used by which two streams may be drained into one channel or one channel separated into two or more, as the case may be, and the careful location of these branches will aid you in the economy of your work as well as in its proper construction. Wherever you find it necessary to locate an outlet for one of your drains, instead of using the ordinary red tile or making a box drain, you will insure greater durability and guard against breakage by frost by using two or three lengths of salt glazed culvert or sewer pipe of the same kind recommended for your culverts.

When Gravel Cannot be Had.—In a former chapter I have described at some length a method of laying center drains in which the channel of the drain is laid in one or more lines beneath the roadway, and the description there given provides for a top filling of stones, coarse gravel, etc., wherever this can be obtained. I ought to say to you, however, that in many parts of the country, and especially in the prairie states of the west, stone and gravel are exceedingly scarce articles and the construction of a roadway involving the use of these materials is out of the question. In such cases it is well to use one or more lines of tile (one will sometimes answer, and I have seen locations

where three or four would not be too many), and in opening the earth roadway to provide for this tile the sloping form of the excavation should be given, as shown in Figs. 1 and 2, on pages 194 and 195. After this is done, and especially if you are handling a soft prairie soil that is easily turned into mud, the slopes of your excavation which incline downward toward the center drain should be rolled as hard and solid as possible, after which a layer of several inches of coarse marsh grass or straw should be laid on with the straws and fibers running lengthwise from each side toward the center of the roadway. Upon this may be profitably placed another layer of grass or straw with the fibers crossing the first at right angles, and then the soil selected for finishing the roadway may be thrown in and brought to the established grade. This method will facilitate draining and drying the upper layer of earth upon which wagons are rolled and enable you to use the road during many weeks of the year when it might, under other circumstances, be well-nigh impassable.

Your plan will, of course, provide for all these things, and ought to show them clearly and with exactness. In running across a level country where embankments are required to raise the roadway to a proper grade, you should avoid the construction of an embankment by loose and wasteful methods sometimes employed by careless contractors. These men are generally paid for their labor according to the amount of material excavated, and it therefore becomes a matter of little concern to them, in many cases, whether the embankment is properly made.

I may, perhaps, illustrate this point clearly by reference to Fig. 12, in which I have shown in cross section an improper form of construction, due to the dumping of earth in layers, in



FIG. 12. SHOWING CROSS SECTION OF ROADWAY BANK, WITH LAYERS OF EARTH IMPROPERLY PLACED.

a form directly contrary to the true method. In this figure the forming of the bank began by dumping material in the center line of the roadway and sloping it to the right and left by the

usual means, after which layers were added in similar form, being always highest at the center and sloping off to either side, as shown in the figure. The result of this kind of work is an embankment which tends to slide off at the sides, involving an extravagant use of material and jeopardizing the permanent character of the work.

Directly opposed to this method, in both procedure and result, is that shown in Fig. 13, in which the bank has been formed

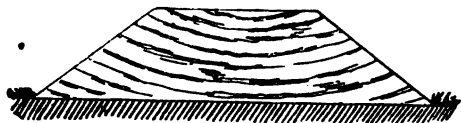


FIG. 13. CROSS SECTION OF EARTH EMBANKMENT, WITH LAYERS PROPERLY PLACED.

on a correct principle. The first loads of material have been carried on at the "toe" of the bank on either side, and successive layers of the bank, as shown in the cross section, are in a form having a downward concave, and insuring stability and economy in the work.

Another form of construction, where cheapness is the main consideration in the making of a dirt road, is shown in Fig. 14. In level countries it may be formed by first marking out the line of side ditches on either side of the roadway and excavating in these lines enough material to raise the roadway a few inches above the original surface of the ground, after which, if possible, the roadway should be rolled and so formed as to slope gradually from the center to the side ditches. When this is done, a few inches of straw, fine brush or coarse grass should be put on, the first or lower layer being laid with the ends or fibers pointing across the roadway, while the second or top layer may be laid in a contrary direction. The total thickness of these two layers of coarse straw or fine brush will depend upon the quality of the material used and upon the weight of the top



FIG. 14. SHOWING EARTH TOP ON LAYER OF GRASS OR BRUSH.

layer of earth which will eventually cover it. In all cases the cross layer should not be so thick as to prevent its compacting into a moderately firm layer, without undue elasticity or

tendency to "give" under the weight of a loaded vehicle. Of course this method of improving an earth road does no insure permanent excellence, but so long as the grass or brush layer retains any of its original form and qualities (and this may be for a considerable period), it will greatly hasten the drying of the road after a wet season, and will tend to quickly drain it at all times, for no reasonable amount of pressure can be exerted by weight upon the road surface that will tend to close or obstruct the little spaces between the various bits of straw and brush, and into these the water will drip in times of rain, and the air will find its way when the drainage has ceased, to the great advantage of the road and, if properly done, to the satisfaction of its builder.

Side-Hill Work.—As already suggested, your road is likely in some places to run along and around the slopes of hillsides, and of course the ordinary form of excavation and embankment, as laid out in level countries in open level fields, will have to be varied. If you attempt to lay an earth embankment along and upon the natural slope of many of these hillsides, you will find that the declivity is too abrupt to sustain your bank and that it is likely at any time to be lost or destroyed by a slide. In some cases where the incline is not too steep, a row of heavy

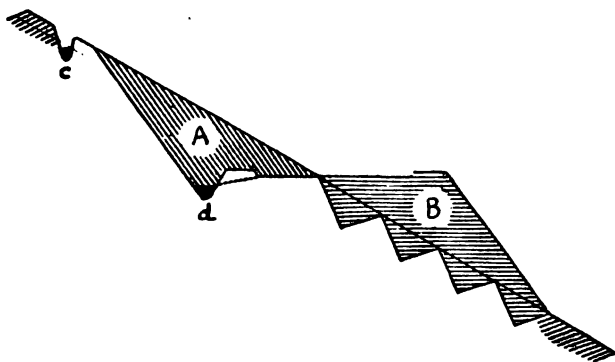


FIG. 15. SHOWING METHOD OF CONSTRUCTION ON SIDE-HILL.

stone slabs set into the slope of the hill along the line of the "toe" will hold the embankment until it solidifies and gains a permanent footing. It will sometimes occur, however, that more elaborate treatment will be required, and in Fig. 15 I

have drawn a cross section to show a simple method of treatment where the earth embankment is laid along the steep side-hill.

The figure represents a cross section of the roadway, and no dimensions are given because the object of the figure is merely to represent the general method of construction, details of each particular case being necessarily left to your own judgment and discretion.

Referring now to the Fig. 15, the long, straight sloping line represents the natural slope of the hillside. At "A" an excavation has been made by cutting into the hillside for the double purpose of providing material for filling the bank of the road at "B" and at the same time insuring the proper width of the road toward the uphill side. To prevent the sliding of the material placed in the bank at "B," steps have been first cut in the hillside, as shown by the angular form of the section under "B," and in this manner the embankment is held in place.

At "c" a ditch is made running lengthwise with the direction of the road. This ditch is intended to catch and carry off the water which comes down from the hillsides in times of heavy rains and when melting snow would cause the rush of water down the steep declivity to reach the road and perhaps destroy it. The dimensions of this ditch "c" will therefore be important and will depend upon the area of the ground from which it is expected to receive flood water and the steepness of the same, since this last item will largely determine the rapidity with which the ditch is likely to be filled.

The ditch "d" serves a purpose similar to that located at "c," besides serving as a side drain for the roadway.

Again it may happen that the side-hill around which your road runs may be so steep that the form of construction shown in Fig. 15 cannot be employed. In such cases you will be compelled to resort to the use of "retaining walls" or "face walls" of masonry, and these must be carefully made to sustain the pressure of the earth which rests against them. In fixing the dimensions of these walls there is wide room for the exercise of judgment, and this judgment is always made more reliable by experience, but I will venture one or two suggestions which may be of service to you in fixing these dimensions.

I assume that you have determined the height of your pro-

posed road at each point along its entire length, and that, therefore, in any given situation you may easily find the height of the retaining wall or face wall which you propose to use. If your wall is designed to sustain earth or other loose material, fill in behind the wall by the usual method of dumping from carts, etc.—it will exert a great pressure against the back of the wall, and, although this pressure is likely to become compact by use and long standing, you must also bear in mind that the same lapse of time is likely to weaken the quality of your wall, and its thickness must be determined with a view of these facts.

The following rule may be relied on with considerable confidence, it being largely adopted by practical engineers and has stood the test of experience. If your wall is of good quality large ranged rubble, laid in strong cement mortar, the horizontal thickness at the bottom equal to .35 of its entire height will

be sufficient. If the masonry is the ordinary scabble rubble, laid in mortar, or if made of brick, make the thickness .4 its entire height. If the wall is of good quality scabble rubble, laid dry, the thickness at bottom should be one-half the entire vertical height. In mentioning the height of the wall I refer to the extreme vertical height from the bottom of the masonry in the foundation pit to the top of the stone work, and not the height of the wall as

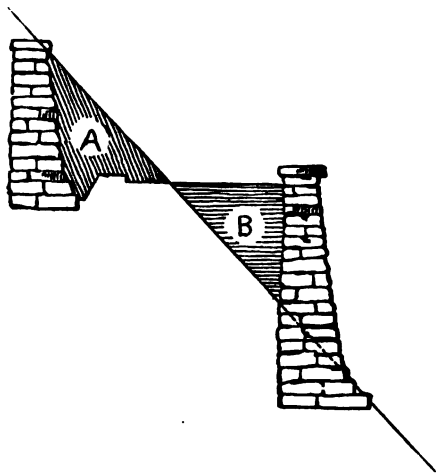


FIG. 16. SHOWING CROSS SECTION OF SIDE-HILL WORK WITH MASONRY.

ordinarily appears above ground after completion. These dimensions may be varied by circumstances, for it rarely happens that two conditions will occur in which the pressure will be exerted exactly alike and the same rule, therefore, made applicable. For example, if clean, pure sand or gravel largely compose the material used for filling behind the walls, the pressure will be greater and more constant than if

the more cohesive soil, such as clay, etc., are used for the same purpose. Sometimes, also, the strength of the wall is increased by inclining the course of the masonry inward, and this plan may have an especial value in a case where dry stone masonry is used (without the use of mortar), or where the work is done so rapidly that the mortar has no sufficient time to set strongly before the earth filling is put in. In locations where deep frost is likely to ensue in Winter, it is a safe plan to give the inner top face of the wall a bevel outward, so that the freezing of the earth for a distance of say six feet below the surface will not tend to heave the masonry or dislodge the stones. This beveled portion may be left smooth, but with this exception the back of the wall may be left as rough as possible. For permanent work, I need only urge you to use plenty of good cement mortar, and if the work is let by contract, have your specifications clearly expressed, and by strict supervision see to it that the wall is made solid and so well cemented as to leave no voids or vacant spaces between the stones.

(To be continued.)

CARRIAGE ACCIDENTS.

WHAT TO DO WHEN A HORSE FALLS.

WHEN a horse falls while drawing a vehicle:

1. Jump down and hold the animal's head, to prevent his dashing it about to his own injury.
2. Loosen the check-rein (if you are so foolish as to use one) and the parts of the harness which fasten on the vehicle.
3. Back the carriage so as to get the shafts and traces clear.
4. Steady and support the horse's head, and excite and encourage him, with hand and voice, to rise.
5. When you have got him up pat and further encourage him, and see if he is wounded or otherwise injured.
6. Let him stand still a short time and recover himself, and then proceed gently and with greater caution than before.

FATHER TOM AND THE POPE; OR, A NIGHT AT THE VATICAN.*

(Pictures by Augusta Sittig.)

[As related by Mr. Michael Heffernan, Master of the National School at Tallymac-taggart, in the County of Leitrim, to a friend, during his official visit to Dublin, for the purpose of studying Political Economy, in the Spring of 1838.]

CHAPTER III.

HOW FATHER TOM MADE A HARE OF HIS HOLINESS IN LATIN.



H, Dochter Whateley, Dochter Whateley, I'm sure I'll never die another death if I don't die aither of consumption or production! I ever and always thought that astronomy was the hardest science that was till now—and it's no lie I'm telling you, the same astronomy is a tough enough morsel to brake a man's fast upon—and geolidgy is middling and hard too—and hydherastatics is no joke; but ov all the books of science that ever was opened and shut, that book upon Pilitical Econimy lifts the pins! Well, well, if they wait until they persuade me that taking a man's rints out ov the counthry, and spinding them in forrain parts is n't doing us out ov the same, they'll wait a long time in troth. But you're waiting, I see, to hear how his Riv'rence and his Holiness got on after finishing the disputation I was telling you of. Well, you see, my dear, when the Pope found he could n't hould a candle to Father Tom in theology and logic, he thought he'd take the shine out ov him in Latin anyhow, so says he, "Misther Maguire," says he, "I quite agree wid you that it's not lucky for us to be spaking on them deep subjects in sich langidges as the evil spirits is acquainted wid; and," says he, "I think it 'ud be no harm for us to spake from this out in Latin," says he, "for fraid the devil 'ud undherstand what we are saying."

"Not a hair I carc," says Father Tom, "whether he undherstands what we're saying or not, as long as we keep off that last pint we wor discussing, and one or two others. Listners never heard good ov themselves," says he; "and if Belzhebut takes

* This famous production is doubtless the best of many short prose writings of its author, William Maginn, a talented Irishman, who was born in Cork ninety-eight years ago. He is said to have been a prince of good fellows; but the same lively, rollicking, imaginative genius which gave mirth to his stories only added to the woes of his reckless and improvident nature, and led him to habits of dissipation and sometimes to the debtor's prison. Maginn was finely educated, a splendid translator, a poet of some merit and a prolific and rapid writer, though to his lack of application may be attributed the fact that many of his articles were ephemeral. His death, which was doubtless hastened by wild living, occurred in 1842.

any thing amiss that aither you or me says in regard ov himself or his faction, let him stand forrid like a man, and, never fear, I'll give him his answer. Howandiver, if it's for a taste ov classic conversation you are, just to put us in mind ov ould Cor-darius," says he, "here's at you;" and wid that he lets fly at his Holiness wid his health in Latin.

"Vesthræ Sanctitatis salutem volo!" says he.

"Vesthræ Revirintia salubratati bibo!" says the Pope to him again (haith it's no joke, I tell you, to remember sich a power ov larning). "Here's to you wid the same," says the Pope, in the raal Ciceronian. "Nunc poculum alterhum imple," says he.

"Cum omni jucunditate in vita," says his Riv'rence. "Cum summâ concupiscintiâ et animositate," says he; as much as to say, "Wid all the veins ov my heart, I'll do that same;" and so wid that, they mixed their fourth gun a-piece.

"Aqua vitæ vesthra sane est liquor admirabilis," says the Pope.

"Verum est pro te,—it's thrue for you," says his Riv'rence, forgetting the idyim ov the Latin phwraseology, in a manner.

"Prava est tua Latinitas, domine," says the Pope, finding fault like wid his etymology.

"Parva culpa mihi," "small blame to me, that is," says his Riv'rence; "nam multum laboro in partibus interioribus," says he—the dear man! that never was at a loss for an excuse!

"Quid tibi incommodi?" says the Pope, axing him what ailed him.

"Habesne id quod Anglicè vocamus, a looking glass," says his Riv'rence.



"WELL, FATHER TOM LAUGHED
LIKE TO BURST."

"Immo, habeo speculum splendidissimum subther operculum pyxidis hujus starnutatoria," says the Pope, pulling out a beautiful goold snuff-box, with a looking-glass in undher the lid; "Subther operculum pyxidis hujus starnutatorii—no—starnutartoria—quam dono accepi ab Archi-duce Austhriaco siptuagisima prætheritâ," says he; as much as to say that he got the box in a prisint from the Queen ov Spain

last Lint, if I rightly remimber.

Well, Father Tom laughed like to burst. At last,

says he, "Pather Sancte," says he, suberrore jaces. 'Looking-glass' apud nos habet significationem quamdam peculiarem ex tempore diei dependentem"—there was a sthring ov accusatives for yez!—"nam mane speculum sonat," says he, "post prandium vero mat—mat—mat"—sorra be in me but I disremimber the classic appellivation ov the same article. Howandiver, his Riv'rence went on explaining himself in such a way as no scholar could mistake. "Vesica mea," says he, "ab illo ultimo eversore distenditur, donec similis est rumpere. Verbis apertis," says he, "Vesthræ Sanctitatis præsentia salvata, aquam facere valde desidhero."

"Ho, ho, ho!" says the Pope, grabbing up his box; "si inquinavissess meam pyxidem, excimnicari debuisses. Hillo, Anthony," says he to his head butler, "fetch Misther Maguire a ——"

"You spoke first!" says his Riv'rence, jumping off his sate: "You spoke first in the vernacular. I take Misther Anthony to witness," says he.

"What else would you have me to do?" says the Pope, quite dogged like to see himself bate thataway at his own waypons. "Sure," says he, "Anthony would n't undherstand a B from a bull's foot, if I spoke to him any other way."

"Well, then," says his Riv'rence, "in considheration ov the needcessity," says he, "I'll let you off for this time; but mind, now, afther I say *præstho*, the first of us that spakes a word of English is the hare—*præstho*!"

Neither of them spoke for near a minit, considhering wid themselves how they wo'r to begin sich a great thrial ov shkill. At last, says the Pope—the blessed man! only think how 'cute it was ov him!—"Domine Maguire," says he, "valde desidhero, certiozem fieri de significatione istius verbi *eversor* quo jam jam usus es"—(well, surely I *am* the boy for the Latin!).

"*Eversor*, id est cyathus," says his Riv'rence, "nam apud nos *tumbleri*, seu eversores, dicti sunt ab evertendo ceremoniam inter amicos; non, ut Temperentiæ Societatis frigidis fautoribus placet, ab evertendis ipsis potatoribus." (It's not every mas-ther undher the Boord, I tell you, could carry such a car-load ov the dead langidges.) "In agro vero Louthiano et Midensi," says he, "nomine gaudent quodam secundum linguam Anglicanam significante bombardam seu tormentum; quia ex eis tanquam ex telis jaculatoriis liquorem faucibus immittere solent.

Etiam inter hæreticos illos melanostomos" (that was a touch of Greek). "Presbyterianos Septentrionales, qui sunt terribiles potatores, Cyathi dicti sunt *facerres*, et dimidium Cyathi *hæf-aglessus*. Dimidium Cyathi verò apud Metropolitanos Hibernicos dicitur *dandy*."—

"En verbum Anglicanum!" says the Pope clapping his hands,—"*Ieporem te fecisti*;" as much as to say that he had made a hare ov himself.

"*Dandæus, dandæus*, verbum erat," says his Riv'rence—oh, the dear man, but it 's himself that was handy ever and always at getting out of a hobble—" *dandæus* verbum erat," says he, "quod dicturus eram, cum me intherpillavisti."

"Ast ego dico," says the Pope, very sharp, "quod verbum erat *dandy*."

"Per tibicinem qui coram Mose modulatus est," says his Riv'rence, "id flagellat mundum! *Dandæus* dixi, et tu dicis *dandy*; ergo tu es lepus, non ego—Ah, ha! Saccavi vesthram Sanctitatem!"

"Mendacium est!" says the Pope, quite forgetting himself, he was so mad at being sacked before the sarvints.

Well, if it had n't been that his Holiness was in it, Father Tom 'ud have given him the contints ov his tumbler betuxt the two eyes, for calling him a liar; and, in troth, it 's very well it was in Latin the offnce was conveyed, for, if it had been in the vernacular, there 's no saying what 'ud ha' been the consequence. His Riv'rence was mighty angry anyhow.—"Tu senex lathro," says he, "quomodo audes me mendacem prædicare?"

"Et tu, sacrilege nebulo," say the Pope, "quomodo audacitatem habeas, me Dei in terris vicarium, lathronem conwiciari?"

"Interroga circumcirca," says his Riv'rence.

"Abi ex ædibus meis," says the Pope.

"Abi tu in malem crucem," says his Riv'rence.

"Excumnicabo te," says the Pope.

"Diabolus curat," says his Riv'rence.

"Anathema sis," says the Pope.

"Oscula meum pod,"—says his Riv'rence—but, my dear, afore he could finish what he was going to say, the Pope broke out into the vernacular, "Get out o' my house, you reprobate!" says he in sich a rage that he could contain widin the Latin no longer.

"Ha, ha, ha!—ho, ho, ho!" says his Riv'rence, "Who's the hare now, your Holiness? Oh, by this and by that, I've sacked you clane! Clane and clever I've done it, and no mistake! You see what a bit ov desate will do wid the wisest, your Holiness—sure it was joking I was, on purpose to aggrawate you—all 's fair, you know, in love, law, and conthravarsy. In troth if I 'd thought you 'd have taken it so much to



"GET OUT O' MY HOUSE, YOU REPROBATE!"

heart, I 'd have put my head into the fire afore I 'd have said a word to offend you," says he, for he seen that the Pope was very vexed. "Sure, God forbid that I 'd say any thing agin your Holiness, barring it was in fun: for are n't you the father ov the faithful, and the thrue vicar ov God upon earth? And am n't I ready to go down on my two knees this blessed minit and beg your apostolical pardon for every word that I said to your displeament?"

"Are you in arnest that it is in fun you wor?" says the Pope.

"May I never die if I am n't," says his Riv'rence. "It was all to provoke your Holiness to commit a brache ov the Latin that I tuck the small liberties I did," says he.

"I 'd have you to take care," says the Pope, "how you take sich small liberties again, or maybe you 'll provoke me to commit a brache of the pace."

"Well, and if I did," says his Riv'rence, "I know a sartan preparation ov chemicals that 's very good for curing a brache aither in Latinity or friendship."

"What 's that?" says the Pope, quite mollified, and sitting down again at the table that he had ris from in the first pluff of his indignation. "What 's that?" says he, "for, 'pon my Epistolical 'davy, I think it 'ud n't be asy to bate this miraculous mixthir that we 've been thrying to anilize this two hours back," says he, taking a mighty scientific swig out ov the bottom ov his tumbler.

"It 's good for a beginning," says his Riv'rence; "it lays a

very nate foundation for more sarious operation; but we're now arrived at a pariod of the evening when it's time to proceed wid our shuperstruchure by compass and square, like free and excipted masons as we both are."

My time's up for the present; but I'll tell you the rest in the evening at home.

* * * * *

Glory be to God! I've done wid their lecthirs—they may all go and be d——d wid their consumption and production. I'm off to Tallymactaggart before daylight in the morning, where I'll thry whether a sod or two o' turf can't consume a cartload ov heresy, and whether a weekly meeting ov the lodge can't produce a new thayory ov rints. But afore I take my lave of you, I may as well finish my story about poor Father Tom that I hear is coming up to whale the heretics in Adam and Eve during the Lint.

The Pope—and indeed it ill becomes a good Catholic to say anything agin him—no more would I, only that his Riv'rence was in it—but you see the fact ov it is, that the Pope was as envious as ever he could be, at seeing himself sacked right and left by Father Tom, and bate out o' the face, the way he was, on every science and subjec' that was started. So, not to be out-done altogether, he says to his Riv'rence, "You're a man that's fond of the brute crayation, I hear, Misther Maguire?"

"I don't deny it," says his Riv'rence, "I've dogs that I'm willing to run again any man's, ay, or to match them agin any other dogs in the world for genteel edication and polite manners," says he.

"I'll hould you a pound," says the Pope, "that I've a quadhruped in my possession that's a wiser baste nor any dog in your kennel."

"Done," says his Riv'rence, and they staked the money.

"What can this larned quadhruped o' yours do?" says his Riv'rence.

"It's my mule," says the Pope, "and, if you were to offer her goolden oats and clover off the meadows o' Paradise, sorra taste ov aither she'd let pass her teeth till the first mass is over every Sunday or holiday in the year."

"Well, and what 'ud you say if I showed you a baste ov mine," says his Riv'rence, "that, instead ov fasting till first

mass is over only, fasts out the whole four-and-twenty hours ov every Wednesday and Friday in the week as reg'lar as a Christian?"

"Oh, be asy, Masther Maguire," says the Pope.

"You don't b'lieve me, don't you?" says his Riv'rence; "very well, I 'll soon show you whether or no," and he put his knuckles in his mouth, and gev a whistle that made the Pope



"HE PUT HIS KNUCKLES IN HIS MOUTH AND GEV A WHISTLE."

stop his fingers in his ears. The aycho, my dear, was hardly done playing wid the cobwebs in the cornish, when the door flies open, and in jumps Spring. The Pope happened to be sitting next the door, betuxt him and his Riv'rence, and may I never die, if he did n't clear him, thriple crown and all, at one spang. "God's presence be about us!" says the Pope, thinking it was an evil spirit

come to fly away wid him for the lie that he had tould in regard ov his mule (for it was nothing more nor a thrick that consisted in grazing the brute's teeth); but seeing it was only one ov the greatest beauties ov a greyhound that he 'd ever laid his epistolical eyes on, he soon recovered ov his fright, and began to pat him, while Father Tom ris and went to the sideboard, where he cut a slice of pork, a slice ov beef, a slice ov mutton, and a slice ov salmon, and put them all on a plate thegither. "Here, Spring, my man," says he, setting the plate down afore him



"'HERE, SPRING, MY MAN,' SAYS HE, SETTING THE PLATE DOWN."

on the hearth-stone, "here 's your supper for you this blessed Friday night." Not a word more he said nor what I tell you; and, you may believe it or not, but it 's the blessed truth that

the dog, afther jist tasting the salmon, and spitting it out again, lifted his nose out o' the plate, and stood wid his jaws wather-ing, and his tail wagging, looking up in his Rev'rence's face as much as to say, "Give me your absolution, till I hide them temptations out o' my sight."

"There 's a dog that knows his duty," says his Riv'rence; "there 's a baste that knows how to conduct himself aither in the parlor or the field. You think him a good dog, looking at him here; but I wisht you seen him on the side ov Slieve-an-Eirin! Be my soul, you 'd say the hill was running away from undher him. Oh, I wisht you had been wid me," says he, never letting on to see the dog at all, "one day, last Lent, that I was coming from mass. Spring was near a quarther ov a mile behind me, for the childer was delaying him wid bread and butther at the chapel door, when a lump ov a hare jumped ov the plantations ov Grouse Lodge and ran across the road; so I gev the whilloo, and knowing that she 'd take the rise ov the hill, I made over



"I MADE OVER THE DITCH AND UP
THROUGH MULLAGHCASHEL."

the ditch, and up through Mullagh-cashel as hard as I could pelt, still keeping her in view, but afore I had gone a perch, Spring seen her, and away the two went like the wind, up Drumwry, and down Clooneen, and over the river, widout his being able ons't to turn her. Well, I run on till I come to the Diffagher, and through it I went, for the wather was low and I did n't mind being wet shod, and out on the other side, where I got up on a ditch, and seen sich a coorse as I 'll be bound to say was never seen

afore or since. If Spring turned that hare ons't that day, he turned her fifty times, up and down, back and for'ard through-out and about. At last he run her right into the big quarry-hole in Mullaghbawn, and when I went up to look for her fud, there I found him sthretched on his side, not able to stir a foot, and the hare lying about an inch afore his nose as dead as a door-nail, and divil a mark of a tooth upon her. Eh, Spring is n't that thrue?" says he. Jist at that minit the clock sthruck

twelve, and, before you could say thrap-sticks, Spring had the plateful of mate consaled. "Now," says his Riv'rence, "hand me over my pound, for I 've won my bate fairly."

"You 'll excuse me," says the Pope, pocketing his money, "for we put the clock half an hour back, out ov compliment to your Riv'rence," says he, "and it was Saturday morning afore he came up at all."

"Well, it 's no matther," says his Riv'rence, putting back his pound-note in his pocket-book, "only," says he, "it 's hardly fair to expect a brute baste to be so well skilled in the science ov chronology."



"'YOU 'LL EXCUSE ME,' SAYS THE POPE, POCKETING HIS MONEY."

In troth his Riv'rence was badly used in the same bate, for he won it clever; and, indeed, I 'm afeard the shabby way he was thrated had some effect in putting it into his mind to do what he did. "Will your Holiness take a blast ov the pipe?" says he, dhrawing out his dhudeen.

"I never smoke," says the Pope, "but I have n't the least objection to the smell of tobaccay."

"Oh, you had betther take a dhraw," says his Riv'rence, "it 'll relish the dhrink, that 'ud be too luscious intirely, widout something to flavor it."



"THEN FATHER TOM HELD THE COAL HIMSELF."

"I had thoughts," said the Pope, wid the laste sign ov a hiccup on him, "ov getting up a broiled bone for the same purpose."

"Well," says his Riv'rence, "a broiled bone 'ud do no manner ov harm at this present time; but a smoke," says he, "'ud flavor both the devil and the dhrink."

"What sort o' tobaccay is it that 's in it?" says the Pope.

"Raal nagur-head," says his Riv'rence; "a very mild and salubrious species of the philosophic weed."

"Then, I don't care if I do take a dhraw," says the Pope. Then Father Tom held the coal himself till his Holiness had the pipe lit; and they sat widout saying anything worth mentioning for about five minutes.

At last the Pope says to his Riv'rence: "I dunna what gev me this plaguy hiccup," says he. "Dhrink about," says he—"Begorra," he says, "I think I 'm getting merrier nor 's good for me. Sing us a song, your Riv'rence," says he.

Father Tom then sung him "Monatagrenoge" and the "Bunch o' Rushes," and he was mighty well pleased wid both, keeping time wid his hands, and joining in in the choruses, when his hiccup 'ud let him. At last, my dear, he opens the lower buttons ov his waistcoat, and the top one of his waistband, and calls to Masther Anthony to lift up one ov the windys. "I dunna what 's wrong wid me, at all at all," says he, "I 'm mortal sick."

"I thrust," says his Riv'rence, "the pasthry that you ate at dinner has n't disagreed wid your Holiness' stomach."

"Oh, my! oh!" says the Pope, "what's this at all?" gasping for breath, and as pale as a sheet, wid a could swate bursting out over his forehead, and the palms ov his hands spread out to catch the air. "Oh, my! oh, my!" says he, "fetch me a basin!—Don't spake to me. Oh!—oh!—blood alive!—Oh, my head, my head, hould my head!—oh!—ubh!—I 'm poisoned!—ach!"

"It was them plaguy pasthries," says his Riv'rence. "Hould his head hard," says he, "and clap a wet cloth over his timples. If you could only thry another dhraw o' the pipe, your Holiness, it 'ud set you to rights in no time."

"Carry me to bed," says the Pope, "and never let me see that wild Irish priest again. I 'm poisoned by his manes—ubplsch!—

ach!—ach!—He dined wid Cardinal Wayld yestherday," says he, "and he 's bribed him to take me off. Send for a confessor," says he, "for me latther end 's approaching. My



"OH, MY! OH, MY!" SAYS HE,
"FETCH ME A BASIN."

head 's like to split—so it is!—Oh, my! oh, my!—ubplsch!—ach!”



“NOT ONE OF THEM AXED
HIM TO LAVE THEM
A LOCK OV HIS HAIR.”

Well, his Riv'rence never thought it worth his while to make him an answer; but, when he seen how ungratefully he was used, afther all his throuble in making the evening agreeable to the ould man, he called Spring, and put the but-end ov the second bottle into his pocket, and left the house widout once wishing “Good-night, an' plaisant dhramas to you;” and, in troth, not one of *them* axed him to lave them a lock ov his hair.

That 's the story as I heard it tould; but myself does n't b'lieve over one-half of it. Howandiver, when all 's done, it 's a shame, so it is, that he 's not a bishop this blessed day and hour; for, next to the goiant of St. Jarlath's, he 's out and out the cleverest fellow ov the whole jing bang.

ART IN CARRIAGE MAKING.

MEN whistle sometimes when they hear the price of the best carriage in the market, and are surprised to learn that many houses are built and furnished more quickly than a first-class carriage can be made, says the *Pittsburg Press*. It is possible to build a good carriage in a month, but one that will rank as the very best that workmen can put together cannot be made in less than four months, and very often where the vehicle is made to order, six months is expended in completing it. An artist or a sculptor furnishes no more interesting study to those fond of watching skilled hands at work than the various artisans in a perfectly equipped carriage factory. The painting of a carriage alone is an undertaking that requires months of time when the best work is desired. Nine different processes are required to secure perfect results. The finishing-room is an apartment compared with which the hot room of a Turkish bath seems like a refrigerator. From the intense heat at which the room is of necessity kept, the varnisher can do but little work at a time, his visits being short for fear of suffocation. All this discomfort has to be endured to guard against the entrance of flies and other insects and dust into the room. A single fly would quickly do fifty dollars worth of damage.—*Amesbury Vehicle*.



FOUR HUNDRED AND EIGHTY separate publications, containing articles favorable to GOOD ROADS and commending its work, have been laid on the editor's table during the month of April. We print this announcement for the pleasure and gratification it will give to those old friends who have stood by us through the thick and thin of a long fight, and for the encouragement of all those later friends whose interest in the progress of the work will be strengthened by popular approval, and by the comfortable feeling that we are on the upward turn of the wheel.

GOOD ROADS in politics? Certainly. We preach it, urge it, and every day see more clearly the need of it. Politics is the science of government; but the average modern politician seems never to have found out what he is there for. He is eternally behind the light-house, watching the ebb and flow of public opinion and dancing attendance upon what to him seems a likely and popular idea. A presidential election is almost at hand, and this is the year when your vote and ours will count in a close fight. Most of us are either Republicans or Democrats, and it goes without saying that neither of these parties can better mend its ways than by lending a strong hand in the movement to mend the common roads and the miserable laws of which these roads are born. In the great pivotal State of New York the wheelman vote alone will not fall short of 20 000 in the next November election, and this number easily represents the balance of power between the great political parties. How shall we vote? Well, to begin with, there is no room for a comfortable compromise on the question of good roads, and we may easily say that *the man or the party that is not for us is against us*. If you are a Democrat make it clear that no candidate is a good enough Democrat for your vote who has put himself on record against improved roads, or who refuses to take an active

part in the movement to secure them. If you are a Republican your time will soon come to repudiate and reject every soft-headed, narrow-minded candidate who pretends to represent your party, and, if need be, to discard the party that foists him and his mental goods and chattels into the market of public favor. A little later there will be an open chance for these parties to declare themselves on this question, and then—well, look out for a scientific straddle!

THE very excellent suggestion of Colonel Albert A. Pope to include under one roof the roads improvement exhibits of the Columbian Exhibition, is worthy of the most favorable comment. It seems that, under existing arrangements, the commissioners have separated the different classes of road-making machinery and materials in such a manner that they can be found only by visiting several separate buildings—a plan which not only serves to disconcert any visitor who takes special interest in this class of exhibits, but worse than all, destroys the interest and force of the exhibits themselves, and makes impossible the object lesson which might be conveyed by a greater unity and better system. Mr. S. H. Peabody, Chief of the Department of Liberal Arts, while conceding that "no other material interest in the United States rests under so dense a cloud of ignorance" as road-making, seems to doubt whether sufficient space can be set apart to illustrate the practical process of road-making or the exhibit of materials suggested by Colonel Pope. Mr. Peabody's letter, which has been largely printed, proposes a practical exhibit as follows:

1. Statistics of the extent and kind of improved roads made in several European countries; cost of construction and maintenance, with rates of wages, etc.
2. Diagrams and photographs of good and bad roads at home and abroad; and of larger machines used in the work.

3. Sections of good roads; gravel, Telford, macadam, plank, covered with asphalt; paved with wooden blocks, bricks, granite blocks, stone slabs, etc., etc. As the methods of construction are the important lessons, these sections need not be long; they might show the curb, gutter, the rise of the road, and the sequence of the strata. All these items could be seen on a form, say ten feet long and three feet wide; the length extending from the outer edge of the gutter, toward the middle of the road, and the width extending along the length of the road.

4. Printed matter illustrative of the art of road-making, for distribution to such as might wish for it.

Mr. Peabody's letter then proceeds as follows:

"If an exhibit of such sort could be made, I would try to find a place for it in the Liberal Arts. If that will not answer your purposes I should have to refer you to the Department of Agriculture. I am quite confident that your proposition to make a separate department, with a house, grounds, and a collection of machinery, will not be entertained for lack of opportunity.

"I shall be glad to assist in any scheme that seems practicable under the conditions and limitations of the Exposition, and recognize that your offer of pecuniary aid is very generous."

It is to be regretted that this much-needed department of the Exhibition cannot be established on the magnitude suggested by Colonel Pope; but it would be a matter of deeper regret if the present desultory and unsystematic plan of exhibit should be carried out.

THE number of male convicts in the penitentiaries of the United States is 43,442. Taking the number of working days in each year at 300, and the average value of labor at \$1.25 per day per man, we find that the States have on hand something over \$16,000,000 worth of labor per year, which is either practically tied up or so poorly employed as to yield to the States no adequate revenue. Add cost of keeping, say \$9,000,000, and the aggregate swells to \$25,000,000; to produce which sum per year an invest-

ment of \$500,000,000 at five per cent. would be required. And during the while of enforced idleness which exists among the penitentiary convicts all over the country, we are each day losing the services of some \$60,000 worth of good bone and muscle which might, with benefit to the convicts and profit to the country, be employed in the improvement of the public roads.

ONE of our religious contemporaries gives itself much pain upon discovering that the title "The Gospel of Good Roads" contains a word which the writer claims to belong exclusively to the vocabulary of religion, and proceeds to lament the use of a "divinely given" name in the treatment of temporal subjects. It has always been our belief that human language came first and the Bible afterwards, and that the original vocabulary employed to express human ideas came one day to be used by sacred writers in their essays upon all subjects within the range of spiritual conception. Indeed, since man has little means of understanding except through the medium of the language taught him by daily communication with his mortal brothers, it may be fairly assumed that religious writers were compelled either to employ the words in common use or attempt the absurd scheme of preaching by means of a vocabulary which the people had never heard of and could not understand. To say, therefore, that the words adopted for use in scriptural writings should be forever taken out from the vocabulary of common things, would be to rob poor mortals of their only common way of expressing ideas, and to one who urges the ridiculous theory that a mere word becomes sacred because once used in sacred reference, the world must have acquired a distorted look and the condition of humanity a gruesome and hopeless phase. But, from the opposite direction, and from the standpoint of common opinion, adopted by necessity and approved by use, the preacher of such absurdities is hardly worthy of a hearing; and if we apply the generally accepted theory that a man and his opinions are largely the creatures of his daily diet, it would seem to follow that this piece of ridiculous twaddle is strongly suggestive of a diet of peppermint candy and small beer.

LAW AND LEGISLATION

THE county commissioners are being importuned to hitch another bond proposition to the Nebraska Central matter and have it up at the same election. This is nothing more or less than to let the taxpayers vote upon the proposition of issuing \$150,000 or \$200,000 of long time bonds for the improvement of the country roads leading into Omaha and the other towns of Douglass County. Some of the commissioners have given this matter considerable thought, and unhesitatingly state that it is almost an absolute necessity. The idea is to grade a number of these roads to a width of thirty feet and then cover the surface with broken stone or brick.—*Omaha Rec.*

MARYLAND.—New road laws have been enacted or are on their passage in ten counties. Some of these make radical changes in existing methods, and all evince an awakened public interest in this most important economic subject.

A JOINT resolution has been introduced in the Kentucky Legislature by Representative Dickson, providing for a committee "to examine into and report upon the free turnpike, plank and gravel roads of such States as have adopted road systems of that kind." The Louisville *Commercial*, in a strong editorial, urges its adoption.

THE Cleveland, Ohio, *Leader*, of April 2, says:

"The passage of the Pudney road law in constitutional form, assures the beginning of good roads in Cuyahoga County and is a matter for public congratulation. In the form enacted, the country districts will pay one and one-half mills and the city one-half a mill for road purposes. While this leaves the city rate larger in proportion to benefits derived than that of the country, it will contribute to a public improvement in which every one is interested in some degree and which will be a credit to the county.

BEFORE the meeting of the Legislatures next Winter we expect to publish in GOOD ROADS a carefully prepared article on the subject of Road Legislation, in which the best and most successful methods will be set forth.

HON. L. J. MORRIS, of Morrisville, Ala., a candidate for the State Legislature, has informed the reporter of the *Anniston Hot Blast* that he proposes to risk his chance for election by advocating a bonded indebtedness for the purpose of constructing a system of pike roads in the county. On this kind of a platform the gentleman certainly ought to be elected. Calhoun County is practically out of debt and would progress as she has never done before if she had such a system of roads.

AT St. Joseph, Mo., the County Court, on April 13, appointed delegates to the State Road Reform Convention to be held at Springfield, May 4.

THE Governor of New Jersey has just signed what is called the Davidson road bill, which puts it in the power of county boards of freeholders to contract, under certain specific regulations, for the construction of macadamized roads. Provision is made for thorough supervision and for substantial work. But no more is to be done in any single year than may be paid for by a tax of one-half of one per cent. on the taxable property in each county. One-third of the costs of roads so constructed is to be paid each year by the State, not to exceed the sum of \$75,000; if one-third of the cost shall exceed that amount, the excess is to be apportioned among the counties in proportion to the amount of work done. On petition of two-thirds of the real estate owners fronting on any public road, setting forth their willingness to pay ten per cent. of the cost of macadamized roadways of not less than a mile in extent, the freeholders are compelled to provide for the construction asked for.



NEWS AND COMMENT

We want names and Post Office addresses (plainly written) of every civil engineer, supervisor, selectman, road commissioner, chosen freeholder, contractor, city engineer, surveyor and legislator in the United States. Kindly send all the names you can to GOOD ROADS, Potter Building, New York.

THESE are the days when the commercial agency reports, almost without exception, contain the stereotyped but ever true statement: "Bad weather and impassable roads retard business. Country merchants report slow collections, and not a few business embarrassments are directly traceable to this cause."

A LATE dispatch from Ottumwa, Iowa, reads like this:

"Trade in Southern Iowa is almost suspended because of the impassable roads. The farmers are unable to drive anywhere, and the rains of the past two days have made the mud blockade very formidable. The bottom of the roads has practically dropped out and farm products are scarce."

If any good can be got out of such a condition of things beyond an early supply of angleworms for the woodcocks and robins, it has yet to be found out.

THE farmers of Maryland are becoming thoroughly interested in the movement for good roads. The *Baltimore American* is deserving of much credit for the lead it has taken in the matter. Its editorials upon the subject have been both able and numerous. The rural press has taken the cue and has entered into the work with a vim. A result of this has been that the question has been discussed by the Legislature, and all through the State meetings have been held, the largest of which recently occurred at Baltimore. Here the farmers from all over the State gathered and discussed the feasibility of plans looking to the improvement of the condition of their roads. Resolutions were

passed at this meeting which lead largely to the passage through the Legislature of several local laws for the improvement of certain roads. The movement has only just begun in that State. Those now in the work have the position and talents necessary to form a nucleus about which a general movement is forming which should have the happiest results.

MONTANA is ahead of some of her Eastern sisters in getting a strong grasp on the situation. Here is an item from the *Daily Inter Mountain* (Butte, Mont.) of April 20:

The livery men, teamsters and hackmen of Butte unite in the declaration that there is not a good road anywhere in Silver Bow County.

The records show, however, that thousands of dollars are spent monthly on the roads, and the taxpayers are beginning to inquire why the results of such expenditures are not more noticeable. For instance, in the published statement for the month of April we find the following items:

M. Meeks, road work.....	\$84.00
T. McLaughlin, road work.....	78.00
B. T. Haley, road work.....	81.00
H. Carroll, road work.....	75.00
D. Mullin, road work.....	81.00
J. J. Haggerty, road work.....	324.00
M. Moran, road work.....	81.00
J. H. McQueeney, road work.....	162.00
J. Hennessy, road work.....	75.90
Charles McDevitt, road work.....	57.00
William Williams, road work.....	162.00
James Pace, road work.....	12.00
J. J. Haggerty, supervisor.....	125.00

These gentlemen are beginning to wonder whether all that money has been wasted in developing the April crop of Montana mud.

THREE important local bills have passed the New York Legislature and now wait the Governor's signature. They are, first, the bill authorizing the town of New Utrecht to expend \$500,000 in the improvement of its roads, second the bill placing an impor-

tant length of Fort Hamilton Avenue under the jurisdiction of the Brooklyn Park Commissioner, and providing for the issue of bonds to pay for its improvement; and third, a bill having similar reference to the improvement of Twenty-second Avenue under direction of the Park Commissioner. To the success of these important measures credit is largely due to James C. Church, Esq., of the Brooklyn bar, for his zealous and intelligent work.

If the road-making experiences of modern Europe teach us in America one lesson more than another, it is that our common roads should be taken as much as possible out of the hands of the merely local authorities and administered by either the National or the State Governments after some plan in accordance with scientific knowledge and the needs of the people who use the roads.—*Herald*, Chicago, Ill.

For the last six months business has been almost at a stand-still. This depression has not been confined to any locality or to any particular business, but there has been a prevalent dullness which has pervaded everything, and affected all. Yet with this dullness there has been no money crisis, and no lack of money in the trade centers. We must look for some other reason for this depressed condition, and we can easily find it in the condition of our roads.—*Maine Farmer*.

EVERY town in this State should own road machines enough that there should be one for every five miles of road. It is a waste of time and money longer to use the plow, scraper and shovel as it would be to use the scythe, cradle and hand-rake in harvesting.

A roller of some kind must be used after the road is shaped and all loose stones taken out to solidify the road, to help turn off the water and save rutting.—*President Sweet, New York State Roads Improvement Association*.

THE repaving of Broadway, New York, following the laying of the cable conduit in that street, has been completed, and in 175 working days, 2,500,000 granite paving-

blocks have been laid. The contractor, John D. Crimmins, claims that this is the largest number of blocks laid in the same time on one contract. The city retains 30 per cent. of the contract price until October of 1892, in addition to demanding two securities of \$60,000 each for the faithful performance of the work.

THE Georgia Road Congress recently adopted a resolution approving of the use of convict labor in road-making, and holding that labor and property should each bear their fair proportion of road duty, the latter to be an ad valorem tax. Each county is to decide as to the amount and character of the work to be done, and own and furnish the tools to be used. A complete revision of existing road laws is earnestly recommended. At the congress the Highway Improvement Association was formed, with all citizens of Georgia eligible to membership on the payment of fifty cents per annum.

A CHICAGO paper says that a governorship stands waiting for the man who will courageously take hold of a movement and intelligently direct it looking to the establishment of good country roads. If that is true of Illinois it is true of every State in this Union, and is a good enough suggestion for some of the gubernatorial aspirants of Michigan. There is no want of modern civilization so deeply felt as that, not only of country roads but of city pavements. It is the one standing perplexing problem of an age of miracle working.—*Detroit News*.

THE Juniata Valley Road Improvement Association, composed of a membership in Blair and Huntingdon Counties, Pa., held a mass meeting in the Court House, Hollidaysburg, on April 12. A proposed law was formulated and adopted in which the mischiefs of the present road system are remedied, and will be submitted for the approval of the law-makers at the next Legislature. Arthur Kirk, of Pittsburgh, member of the Western Pennsylvania Engineers' Society, and the author of numerous laws, spoke on the necessity of road reform. The central counties of the State are greatly agitated on this public question.

QUERIES AND ANSWERS

"CIVIL ENGINEER."—It would be difficult to say that we indorse any particular formula for computing the thickness of retaining walls or face walls of masonry, or that in regard to matters of computation one author may be considered more reliable than another. So many factors must be considered in computations of this kind, and these factors are so likely to vary (and quite unlikely to be the same in any two given cases), that a reliable rule in any one case would have to be varied to fit the conditions required by another. These changing factors include the quality and weight of stones used in the wall, the style of masonry employed, the exactness with which stones are cut, the quality of cement used and the proportion employed to make the mortar, the care of workmanship, angle of joints between courses, the weight, nature and quality of material which rests against the back of the wall and the angle of the surface upon which this material stands. These and other considerations are all likely to affect the correctness of any formula. Experience is the only safe guide, and good judgment and a knowledge of tools and materials must be relied on in important cases.

"FELIX."—Horse rollers answer very well in many cases, and when the question of cost is important, may well be selected; but steam rollers have some advantages which cannot be attained by horse rollers, and they are preferred by many engineers where heavy rolling is required. Send to the manufacturers named in our advertising columns and get descriptive catalogues. They will inform you more fully than we can do here of the merits of their machines.

"STUDENT."—There has been no cycling record made on the road of 350 miles in twenty-four hours. The record to which you refer was recently made on a track. The best road record made by a bicycle in twenty-four hours is about three hundred miles, we believe.

"O. G. E."—At your distance from town (three miles) you will find a bicycle many times more convenient than a horse and a much quicker means of conveyance, besides being cheaper. It costs nothing beyond the expense of purchase, and you will find it to be a horse that is always saddled and never tired and one that eats nothing and requires little care. It is fast finding its way among the farmers as a sensible and useful vehicle. Consult our advertising columns.

"T. C."—There is a steel harness in the market, but we cannot at this moment recall the name of the maker. It is advertised in some of the trade journals. If you contemplate getting a patent on a harness of this kind we advise you to first examine the records of the patent office at Washington to see whether your idea has not been anticipated by another patent.

"SILAS J. F."—As between iron and wood for bridge purposes, select the former by all means. Iron bridge making has reached a point of excellence and cheapness which ought to leave wooden bridges entirely out of consideration. As a rule the wooden bridge is little if any cheaper in first cost, while frequent repairs and liability to rapid decay soon bring it to be a costly investment. Of course the trusses of a wooden bridge may be protected by paint or by covering, but these are costly and require frequent attention. Any iron bridge maker will give you an estimate of cost if you will write him, stating length of span, width of bridge and other conditions required.

"V. V."—GOOD ROADS is the property of the League of American Wheelmen. It is the only publication owned by the League, or in which the League has any proprietary or pecuniary interest. The *Bicycling World* does not belong to the League, but is the property of a Massachusetts corporation, called The Wheelman Company.

POPULAR OPINION

"THE April copy of GOOD ROADS is a splendid one. Keep up the good work."—*G. E. Johnson, Chief Consul, Kentucky Division.*

"I ENCLOSE list of one hundred names to whom send GOOD ROADS for one year, commencing with January number. I am desirous of creating favorable public opinion among the farmers of Henrico County for good roads, and think the circulation of your most valuable magazine will be most helpful in this direction. If every farmer in the country could have a copy of it I think there would be a revolution in our roads, which are, as a whole, a disgrace to the country." (Check \$100 enclosed.)—*Lewis Ginter, Richmond, Va.*

"GOOD ROADS for April is rich in good things, both light and serious, the two being agreeably mixed. The contributions to road-reform literature from the pens of such men as Hon. J. J. Ingalls, Hon. J. W. Davis and Hon. Clem. Studebaker are valuable and gratifying. The magazine is growing in size and strength and is imbuing many a mind with economic and technical knowledge of a splendid kind."—*The Bearings.*

"THE April number of the magazine GOOD ROADS, with articles on country highways by ex-Senator Ingalls, Hon. Jno. W. Davis, of Rhode Island, Clem. Studebaker, the Indiana wagon-maker, and Isaac B. Potter, the editor, is readable and keeps up the standard set in the earlier issues."—*Buffalo Courier.*

"THE April issue of the new and admirable magazine GOOD ROADS (Potter Building, New York City), contains noteworthy papers by ex-Senator Ingalls ('Roads of the Western States') and the Hon. Clem. Studebaker ('Who Should Build the Country Roads?')"—*Philadelphia Press.*

"GOOD ROADS should be diligently read by every county and township official whose duties have relation in any sense to the common roads of the country. So should every driver of horses and every user of wheeled vehicles read it."—*Junction City (Kansas) Tribune.*

"'GOOD ROADS!' Our readers will notice that we have used quotation marks, and perhaps some may say it is because the subject belongs to a variety of fruit known as 'chestnuts.' But, not so. We quote the title of a new publication—a thoroughly live one, too."—*Chatham (N. Y.) Courier.*

"GOOD ROADS is obtaining great favor with Milwaukee wheelmen and riders throughout the country. * * But its popularity is not confined to those who ride the silent steed. The farmer is interested."—*Milwaukee News.*

"WE commend Mr. Potter's 'Gospel of Good Roads' as a gospel worthy to be preached to the millions of American people who favor a good thing when once they are awakened to appreciate it."—*Kansas Arts and Industries.*

"YOU have succeeded in blending most agreeably your pages of solid, well written information on the important subject of good roads with the most readable and jovial bits of clean humor that it has been my fortune to find in many a day. I look for my GOOD ROADS always impatiently and am never disappointed in the quality of its pages."—*John B. Fitchett, New York City.*

"GOOD ROADS is gaining ground and the movement is gaining friends in this county. I am getting a club of subscribers and shall send you fifty names this month."—*Wallace Green, Clinton, Ia.*

"GOOD ROADS grows better month by month. We are going to use a thousand extra copies among the farmers of Albany County between now and the next November election."—*Peter McChesney, Albany, N. Y.*

"TWENTY-FIVE years hence the richest county in Nebraska will be the one with the best roads."—*Joy Morton.*

"My time is largely taken up in a business way, but I mean to get out in a short time and get some subscriptions to GOOD ROADS. I know that I can send you some. Several of the leading citizens have spoken to me on this question and I hope soon to see some practical steps taken. I send you a lot of names and addresses as per your request in March issue."—*E. E. Ellsworth, Little Falls, Minn.*

"THE United States will have good roads if the League of American Wheelmen can get them."—*Rockland County (N. Y.) Journal.*

"THE League of American Wheelmen contains 25,000 members. Within its ranks are many men of marked ability and talent. It is a decidedly progressive organization. For a number of years it has annually spent thousands of dollars in preaching 'The Gospel of Good Roads,' and in many localities the farmers, usually suspicious of any man who bestrides the wheel, have united with them in a common cause."—*Bideford (Me.) Times.*

"THE League of American Wheelmen is lavish in its expenditure in this direction, and the journal GOOD ROADS, established this year by the League, is ably seconded by farmers' institutes and state and county road associations."—*Western Agriculturist.*

"APRIL number of GOOD ROADS came yesterday, and I have spent a rainy Sunday in a most interesting and profitable way by reading its pages. Your article on 'Dirt Roads and Gravel Roads' should be reproduced in pamphlet form. It is plain enough for everybody to understand and practical enough to turn all the bad roads into good ones."—*E. Flagler, Troy, N. Y.*

"SEND me ten copies of the April number. I enclose \$2 to pay for same. You are doing a splendid work and I should like to make it known to a few of the slow-going farmers in my home county (Essex)."—*T. M. Paoli, Trenton, N. J.*

"I WAS charmed to see that you knew a good thing when you saw it. 'Father Tom' has been my friend in many a weary spell, and I was delighted to find him a friend of yours also. You see this, in a way (as every touch of nature ought to), makes us kin."—*Horace J. Smith, Germantown, Pa.*

"APRIL number of GOOD ROADS was sent me by one of the wheelmen in this town, and I have read it with interest and pleasure. I congratulate your organization upon the elevated and dignified stand it has taken in this much needed public work. You have stirred the country to a point which I should have considered impossible had it been suggested two years ago. Your 'Gospel of Good Roads' is the pamphlet of the century and is worthy to be printed in the language of every civilized people. I enclose \$2 for one year's subscription to GOOD ROADS."—*Ira P. Leach, Roxbury, Mass.*

"I USED to wonder what the League of American Wheelmen was organized for, but since the first number of GOOD ROADS reached me I have felt a sufficient reason for our existence and am proud of my membership in the organization. I am collecting names of all the road officers and town and county officers on Long Island, and intend to send them personally a copy each of the April number if they can be had. I wish you would preserve about 400 copies of this number for my use. I will send for them some time before May 15th. I am satisfied, from my intimate knowledge of the fact, that the large appropriation and strong movement for better roads in Queens County is directly due to your efforts and to the large amount of road literature distributed there by the League during the last two years."—*William J. Lewis, Brooklyn, N. Y.*

"WE are to have a meeting at Phillipsport on April 30th, and I wish you would send me fifty copies, April number, of GOOD ROADS for distribution among the farmers. The road question will be fully discussed. If you have any extra copies of back numbers containing the 'Gospel of Good Roads' send from fifty to one hundred of these if you can spare them and I will remit on receipt of account. I am preparing a lecture on this subject and propose to illustrate it by means of stereopticon views of good and bad roads. Can you put me in the way of getting lantern slides for this purpose."—*Robert H. Wiles.*

"I AM a member of the L. A. W. and have received a copy of your publication. At a recent meeting of the National Real Estate Association I introduced a resolution, which was adopted, authorizing the president to appoint a committee of one man in each State to co-operate with your Roads Improvement Bureau in its work. This committee will be appointed some time within the next month and will be in shape for business in a practical way before the convening of the next Legislature."—*Walter Pollock, Editor, Etc., Milwaukee, Wis.*

"GOOD ROADS, which has a large circulation throughout New Jersey, is doing good work. I enclose you a clipping of the Jersey City *Herald* of April 30th, which shows you that your labor has not been in vain."—*G. A. Shaw, Jersey City, N. J.*

"I ENCLOSE several interesting items. Am informed that the Columbus (Neb.) *Telegram* and the Beatrice (Neb.) *Express* have taken up the battle for good roads."—*F. N. Clarke, Omaha, Neb.*

"A COPY of your publication fell into my hands, and I am only too glad to enter the ranks as a subscriber. Enclosed please find \$2.00; send me all the numbers. * * * I send you list of officials to send sample copies. It would be well to not send them all the same numbers, as they will then get different ideas. Wishing you the success your efforts deserve, I am, very truly yours."—*George F. Peabody, Appleton, Wis.*

"I ENCLOSE herewith post-office money order for \$2.00 in payment for one year's subscription for GOOD ROADS. * * * It is a pleasure to read the magazine and to commend not only its aim, but the happy manner in which you have launched your worthy enterprise and propose to carry it forward. * * * I wish your paper could reach every farmer in the West and South. It can at least reach every farmers' alliance and agricultural society over the land. It is the farmer who must be converted."—*T. J. Nye, Dallas, Texas.*

"I MAIL you under another cover a copy of today's *Tribune*, containing an extended article and editorial on the subject of highways in Minnesota. The *Tribune* has begun a crusade for road improvement and intends to hammer away at the matter until something is accomplished. The article in question consists of communications from our regular correspondents. The L. A. W. is doing what it can in this direction as well. I am an enthusiastic wheelman myself and a member of the League. It occurred to me that you would be interested in knowing what we are doing out this way."—*A. M. Welles, Minneapolis, Minn.*

"I MAIL you to-day a bundle of five of my latest issues. Kindly look them over, first and eighth pages in each, and see how much I do for the roads. Dane County, Wis., has decided to go in for the new roads with a hurrah, and the city of Madison has legislated for four inch tires. I loan GOOD ROADS to the farmers and have a buxom sentiment growing for it."—*L. B. Ring, Neilsville, Wis.*

CONTRACT NOTES

ROADS AND STREETS.

OHIO.—The town of Barnesville expects to pave about a mile and a half of the roads of that place during the coming Summer.

The authorities of Cleveland ask bids for the paving of one street with Medina stone and for grading, paving the gutters, etc., of one other street.

Bids are asked for paving with brick one street at Salem.

At Youngstown bids are asked for the paving of two streets.

The City Auditor of Cincinnati is authorized to issue \$450,000 additional paving bonds. Two contracts for paving with granite blocks have been awarded—one to D. Folz & Sons at \$85,000 and the other to J. A. Eberhardt at \$130,935. Bids are asked for the paving of two streets with asphalt.

Bid are asked at Springfield for paving three streets with brick.

The authorities at Mansfield ask bids for paving three streets with brick and for other street improvements.

TOLEDO.—Bids are asked for paving one street with asphalt on cement foundation.

Specifications for brick paving, to cost \$38,810, are completed by the City Engineer of Defiance.

Five thousand dollars is to be spent in street improvements at Genoa, and the surrounding roads at Middlepoint are also to be improved.

Zanesville has sold \$50,000 of street and sewer bonds.

Piqua will pave the Public Square with brick.

A new paving-brick company, with a capital of \$30,000, has started at Canton.

Contracts to the amount of \$10,370.75 have been awarded for street grading and paving at Toledo.

LEIPSIK.—The main street of this town is to be paved with fire-clay brick.

Daniels Street, Cincinnati, is to be paved from Euclid to Jefferson Avenues, by Messrs. Hayes & Quill, at a bid of \$7,705.50.

The contract for paving South Erie Street, Massillon, has been awarded to George W. Lemon, of Wheeling, W. Va.

Funk & Coleman are to lay the pavement on South Main Street at Findley, for which a million brick will be required.

The Commissioners of Franklin County are authorized to issue \$20,000 in bonds for road improvements.

Center Street, Ashtabula, is to have the honor of being the first street in that city to be improved. The Council of the city has so resolved.

The Board of Hamilton County Commissioners at Cincinnati are ready to receive sealed proposals at their office for the improvement of Pleasant Ridge and Madisonville Road, Columbia Township.

COLUMBUS.—Oak Street, from Parsons Avenue to Eighteenth Street, is to be improved by surfacing with asphalt. The estimated cost is \$11,411.50.

The citizens of a certain township in Van Wert County voted four to one in favor of a proposition to spend \$100,000 for piking roads.

RHODE ISLAND.—The progressive town of Cranston has voted \$50,000 for macadamizing its streets, \$5,000 for a steam roller and \$2,500 for stone crusher and power.

TEXAS.—The Road and Bridge Committee of the County Commissioners of Galveston County ask bids for gravel, stone and sheels for macadamizing roads.

MISSOURI.—**ST. LOUIS.**—Proposals will be received by F. J. O'Flaherty, County Surveyor, for macadamizing Highland Avenue.

Four streets of Kansas City are to be paved with vitrified brick, two with Macadam and one with Trinidad asphalt.

VIRGINIA.—Proposals are asked for paving streets in Roanoke with granite blocks and vitrified brick. Applications for specifications, etc., should be made at the office of the Board of Public Works.

The Board of Public Works of Roanoke asks bids for paving several streets.

Alexandria proposes to pave all of its new streets.

MASSACHUSETTS.—Elm Street, at Westfield, is to be paved with granite blocks at a cost of about \$36,000. 15,000 square yards of blocks will be needed.

Sewer bonds, to the amount of \$20,000, will be issued by the town of Westboro.

The Council of Cambridge has voted \$50,000 for sidewalks and edge stones.

At Holyoke, 3,000 square yards of granite paving blocks are to be laid.

Elm Street, Westfield, is being paved with granite blocks at a cost of about \$30,000.

BOSTON.—The Finance Committee will provide, by request, \$85,000 to improve Seaver Street.

To the Rockport Granite Company has been awarded the contract to supply to the street department of Boston 300,000 large granite paving blocks, and James F. McIntosh will furnish beach sand.

NEW YORK.—The city of Brooklyn is authorized to expend \$1,000,000 for new granite block street pavements.

At Buffalo, contracts have been awarded to the Barber Asphalt Paving Company and to the German Rock Asphalt Company for the paving of several streets, and a petition to pave two streets with Trinidad asphalt and one with brick has been reported favorably by the Street Committee.

Commissioner Gilroy, of New York City, asks

bids as follows: For 20,000 cubic yards of sand, 700 cubic yards of broken stone of trap rock, 1,500 cubic yards of gravel, and also several grading, flagging and curbing contracts. Contracts amounting to about \$187,000 have been awarded to the Barber Asphalt Paving Company.

The Warren-Scharf Asphalt Paving Company has received the contract for paving Concord Avenue, Rochester, at a bid of \$14,025.

The city of Troy is to have \$125,000 for street improvements, provided for by a bill just passed by the Legislature.

Bids are asked for broken trap rock-stone and Tompkins Cove blue stone, also for grading three streets. L. J. Hintz, Commissioner of Street Improvements, 23d and 24th Wards.

A list of streets to be paved in New York City with the special appropriation of \$1,500,000 has been submitted by the Commissioner of Public Works. It includes granite blocks on concrete and asphalt on present stone. The work will probably be begun at an early day.

BROOKLYN.—Atlantic Avenue is to be repaved with granite blocks at a cost of about \$235,000.

A petition is before the Town Board of Hempstead, L. I., to macadamize five miles of the Moriches and Jamaica plank road.

A large amount of brick paving and macadamizing is to be done this year at Dunkirk.

The Barber Asphalt Company was awarded the contracts for paving the following streets in Buffalo: Genesee Street from Main to Niagara Square; Ellicott Street from Northampton to Riley Streets, and Morgan Street from Chippewa to Mohawk Streets, at bids of \$17,024, \$6,329, and \$12,300, respectively.

NEW JERSEY.—Bids are asked by the authorities of Montclair for paving gutters, flagstone crosswalks and sidewalks, and for plankwalks, also for grading and macadamizing in four districts, and for broken stone.

Twenty streets of Newark are to be paved. Work to begin in a few days.

By vote of the people of Ridgewood, that township will be bonded for \$30,000 to macadamize the roads.

Ten miles of Telford roads are to be built in Moorestown Township, for which four and a half per cent. bonds for \$40,000 have been voted.

INDIANA.—Three of the principal streets of New Albany are to be paved with vitrified brick.

The Board of Public Works at Indianapolis has voted to pave one street with Trinidad Lake asphalt.

At Terra Haute bids are asked for paving four streets. The County Clerk is C. H. Goodwin.

PENNSYLVANIA.—At Reading a company is to be formed to construct the proposed boulevard, the driveway of which is to be sixty feet wide and to extend four miles. Preliminary surveys are being made.

Philadelphia has an appropriation of \$325,000 for the paving of Broad Street with asphalt. The regular yearly work of repairing the paved streets will soon be begun. Bids are opened, but the contract has not yet been awarded.

The ordinance for the Park Boulevard in Philadelphia was signed by the Mayor. The length

will be 4,480 feet and it will be 160 feet wide. The estimated cost, including land, is \$5,721,800.

At Sunbury, Market Street is to be paved with brick, cost of which will be \$20,000.

The taxpayers of Abington Township will vote to have \$240,000 of bonds issued for road improvements.

Contracts for paving eight streets in Philadelphia have been given to the Volcanite Paving Company.

A new paving company with a capital of \$100,000 has been incorporated at Philadelphia. The incorporators are John N., James M. and Joseph P. Mack.

DELAWARE.—Bids are asked at Wilmington for setting and re-setting curb, cross-gutters, etc., and for grading several streets.

WILMINGTON.—Delaware Ave. will be widened ten feet at an estimated cost of \$30,000.

DISTRICT OF COLUMBIA.—The District Commissioners ask bids for cement sidewalks.

FLORIDA.—The city of Orlando will issue bonds to the amount of \$17,000 for paving.

The authorities at Deland ask bids for paving and grading.

COLORADO.—100,000 square yards of paving is to be done at Denver during this Spring. To the Barber Asphalt Paving Company the authorities of that town have awarded contracts aggregating \$230,000.

CALIFORNIA.—Four streets at San Francisco are to be paved with bitumen and two with basalt blocks.

The estimate of the Superintendent of Streets of San Francisco for the coming year aggregates \$730,705.

At Redlands there is a movement in favor of street improvements and during the present year \$100,000 will be spent for that purpose.

Thirteen streets in California will be paved with bituminous rock and one with basalt blocks at an early day.

At San Bernardino, 800,000 bricks are being laid on E Street by the California Sewer Pipe Company, of Los Angeles. This is the first step in this direction and it is the intention to have some of the finest streets in the State in this town.

MARYLAND.—Broadway, Baltimore, is to be paved. Sheet Trinidad asphalt is to be used.

NEBRASKA.—Central Avenue, Kearney, is to be paved.

Omaha will spend \$300,000 for paving this year.

WASHINGTON.—At Sioux Falls, the Council has voted to pave twenty-two blocks.

Patchen Bros. made the lowest bid for grading Hilliard Street. It was \$22,220.

MAINE.—Contracts for furnishing to the city of Portland paving blocks and granite grouting have been given to the Maine & New Hampshire Granite Company. They are to receive for the blocks \$1.20 per square yard, or \$50 per mile, and the grouting is to be furnished by them at ninety-eight cents per gross ton.

GEORGIA.—The contract for paving Broad Street, Augusta, was awarded to the Warren-Scharf Asphalt Paving Company, of New York, at \$2.70 per square yard.

Nearly \$400,000 has been expended in street paving at Savannah within the past five years.

BRIDGES.

MASSACHUSETTS.—Sealed proposals are asked for the construction of a wrought iron and steel plate girder highway bridge over the location and tracks of the Fitchburg Railroad at Walden Street, North Cambridge. Plans, specifications, etc., may be seen at the office of the City Engineer in the City Hall in Cambridge, and proposals are to be sent to the Superintendent of Streets. The length of the bridge is to be sixty-three feet, and the width will be forty-two feet between the railings.

VERMONT.—The village of Middlebury is to have a stone bridge built over Otter Creek, to be 160 feet in length. The work will probably be commenced at an early day.

TENNESSEE.—Sealed bids are asked by the Board of Public Works of Knoxville for the construction of three highway bridges (iron), about 2,200 feet in all. Each bid must be accompanied by a certified check for \$1,000, payable to the order of the Chairman of the Board of Public Works, and bids will only be received from authorized agents of manufacturing bridge companies. Plans, etc., can be seen at the office of the City Engineer.—*From Engineering News, April 21, 1892.*

MAINE.—A timber highway bridge is to be built over Cape Neddick River at York Beach. It is to be 500 feet long.

PENNSYLVANIA.—A contract for a bridge to be built across the Lehigh River, at Lower Cata-sauqua, was awarded at a bid of \$11,595.

ILLINOIS.—A bridge is to be built over the Illinois River at Columbia, for which the Columbian Bridge Company has been chartered, and the Hennepin Bridge Company is authorized to build a bridge across the same river at Hennepin, at a cost of about \$25,000.

The new Burlington bridge over the Mississippi at Alton will be a double track structure with eleven spans, and there will be a 400 foot draw.

MISSISSIPPI.—The Columbus Bridge Company has been awarded a contract for a \$15,000 swing bridge at Vicksburg.

WISCONSIN.—LA CROSSE.—The new bridge over the Black River near this city is completed and open for use.

NEW JERSEY.—Bonds for \$100,000 will be issued by Middlesex County for the building of new bridges.

DISTRICT OF COLUMBIA.—A steel plate girder highway bridge is to be built over James Creek Canal, at K Street, Washington.

MARYLAND.—By decision of the City Council's Committee a stone bridge will be built over Jones' Falls at Baltimore, to cost about \$381,000.

WEST VIRGINIA.—At Wheeling two new bridges are to be built across the Ohio River, one of which will be to Bellaire and the other to Kirkwood, Ohio.

MONTANA.—In consideration of \$9,550, the contracts for two bridges to be built over Deep Creek were awarded to G. E. Ingersoll, of Great Falls.

NEW YORK.—The Park Commissioners of Buffalo are to build a bridge at Elmwood Avenue, for

which the City Council has appropriated \$37,500. \$75,000 has been appropriated for this structure, and the cost will probably be within that limit.

MICHIGAN.—Bonds for \$200,000 will be issued at Saginaw for the new bridge work at that place, by vote of the Common Council.

A bridge is to be built at 23d Street, Bay City, for which the contract has been given to the Milwaukee Bridge Company. The plans and specifications provide for a steel bridge 495 feet long, to consist of two fixed and one shore span and a draw 210 feet long, the cost of which will be \$23,647.

CALIFORNIA.—A combination truss bridge, with a 320 foot span, will be built over the Quala River at San Francisco. Doe, Hunt & Co., of San Francisco, have the contract at \$13,469.

INDIANA.—The Commissioners of Parke County have ordered that a free wagon bridge be built across the Wabash River at Montezuma. It will cost \$30,000.

The new bridge over Fall Creek at Indianapolis having been completed, the electric cars are now running without transfer to North Indianapolis.

VIRGINIA.—Warren County is authorized by the State Legislature to borrow \$12,000 for the construction of a bridge over the Shenandoah River.

TEXAS.—A bridge to cost \$25,000 is proposed to cross the Colorado River at a point between Eagle Lake and Vox Populi.

The two bridges now in course of construction across the North and South Gabriel, near Georgetown, will soon be completed.

The iron bridge across the Llano River at Llano is being built by the Wisconsin Bridge Company.

WASHINGTON.—A bridge is to be built at the foot of Pacific Avenue, Seattle, the cost of which will be \$10,500.

The Washington Bridge Company will build a \$10,500 bridge across the Snohomish River at Everett.

The toll bridge across South Fork at Haller having been purchased, it will be open without charge to the use of pedestrians.

OHIO.—Two bridges are being constructed over the Muskingum River at Forest.

Fifteen thousand dollar bonds will be issued in Seneca County to build a bridge over the Sandusky River.

The Commissioners have decided to build a new iron bridge across the Killbuck at Millersburg.

A stone arch bridge will be built at the foot of Main Street, Mt. Vernon, by T. B. Townsend & Co. It will cost \$30,554.12.

KANSAS.—At Endora a bridge is to be built across the Kaw during the present year.

County Commissioners have accepted the plans prepared by W. Hildebrand, of New York City, for a proposed bridge at Quincy Street, Topeka.

MISSOURI.—A highway bridge is to be built across the Missouri River at St. Charles.

The Senate has passed a bill authorizing the construction of a bridge across the Osage River at Warsaw.

COLORADO.—The work has been begun on a bridge which is to span East Bijou Creek at Byers.

BORROWED WIT



GONE.

Our domestic we called Mary Ann,
She came from the County Cavan ;
But, to lessen her toil,
Lit the fire with the oil ;
Now we miss her, and also the can.

"PAPER, sir?" asked the newsboy. "No, I never read," was the blunt answer. "Hi, boys, come here," called out the gamin; "here's a man as is practicin' for the jury!"
—*Ex.*

AN ANGEL IN DISGUISE.

Wife (Sunday night)—Where have you been, John?

Husband—Been t' sacred concert listening to (hic) sacred music.

Wife (sarcastically)—Yes, and drinking sacred beer and whiskey, and smoking sacred cigars. If there are saints on this earth, John Smith, you are one of them.

IT WAS ALL RIGHT.

Hotel Clerk—Is this thousand dollar bill the smallest thing you have about you?

Departing Guest—I am afraid it is.

Clerk (to bell boy)—Here, take this bill out to one of the waiters and ask him to change it.—*Life.*

THE PARSON'S IDENTIFICATION.

Rev. Blackern Cole (during the taking of the collection)—Elder Whaffs, come hyar.

Elder Whaffs—Yaath, pawson. What am it?

"How many amberells am dey in de vestibool?"

"Fo'teen, pawson."

"Um! See if mine ain't amidst dem, Elder Whaffs."

"Wh-what's youah amberell resemble some like, pawson? Jes' gimme de identifications ob it."

"Um, um" (deep thought). "Elder Whaffs, what do de best amberell in de vestibool look like?"—*Boston News.*

LITTLE JOHNNY TELLS A STORY.

One time there was a young gote wich felt butty, and there was a ole ram wich lay in the road, half a sleep, a chune his cud. The gote he had been shet up in a paster ol his life, an had never saw a ram, an he sed to his sister, the gote did, "You jest stan still an se me whipe that freck off the face of the erth."

So the gote he went up before the ram an' stompt his feets an' shuke his head real friteful, but the ram he dident git up, but only jes kep a chune his cud and wotched out between his i lashes. Bime by the gote he backed of and tuke a run, an' then arose up in the air an' come down with his hed on the ram's hed, wack! The gote's hed was busted, but the ole ram he never wank his eye. Then the ole ram he smiled with his mowth, an' sed to the buttégote's sister, "Pears to me, miss, that kangaroo of yourn is mity careless where he lites, he come gum dasted near makin' me swoller my cud."—*San Francisco Examiner.*

HE ALSO BROKE THE RECORD.

"Did you make any good resolutions on New Year's, Michael?"

"Yes, sor."

"And I'll wager you've already broken all you made."

"Yes, sir; and some I didn't make."

DEMANDING A NEW TRIAL.

A verdict of murder in the first degree had just been brought in.

"Your Honor," said the prisoner's counsel, rising and addressing the Court, "I demand a new trial."

"On what ground?" asked the Judge.

"On the ground that some members of the jury are incompetent to render a just verdict. Among them are an undertaker, a rope manufacturer, a florist, and a dealer in mourning goods."

A new trial was granted.

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SOCIETY

VOL. 1.

JUNE, 1892

NO. 6.

An illustrated monthly
magazine devoted to
the improvement
of the public roads
and streets



"Patching and plastering by district
and township overseers and supervisors,
once or twice a year, is waste of money
and labor."

Hon. John J. Ingalls.

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ISAAC B. POTTER

Managing Editor

PUBLICATION OFFICE
POTTER BUILDING NEW YORK

PUBLISHED
BY THE

LEAGUE ROADS IMPROVEMENT BUREAU

"STREETS AND ROADS OF WASHINGTON," in this Number.
"ASPHALT AND ITS USES,"





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GOOD ROADS.

Vol. I.

June, 1892.

No. 6.

OUR FIRST ARTIFICIAL ROAD.

A CENTENNIAL LESSON.

By Horace J. Smith, of Germantown, Pa.

WE, older men, who are not cyclists, recognize with surprise that a new social force has arisen, to wit, the wheelmen, and we bid you Godspeed! For your admirable periodical GOOD ROADS, those of us who have written and hoped for some new social force to bring us good 'high-



HORACE J. SMITH.

ways have a hearty welcome and a Godspeed also. Some may say that the effort on the part of the wheelmen to get good roads is a selfish one; and so it is in part, for all the world is moved on the pivot of selfishness. It needed intelligent selfishness to give us an impetus to the Gospel of Good Roads. The selfishness of the laboring man who did not want his honest day's toil to be underpaid because convict labor came in competition with him, caused us to see the iniquity

of the contract system. It, however, the sturdy convict can be made to labor for the general good, and where his labor benefits the whole community and injures no one, we shall gain. Those consigned to the House of Correction in Philadelphia, who were able to work out, were put upon the roads in the vicinity, and Holmesburgh is now surrounded by excellent highways. If some one would hunt up the record of the aggregate time spent in prison by able-bodied convicts, no doubt it would be found

that enough labor has been squandered in idleness to have furnished us within the last hundred years with an immense mileage of good roads. Shall this labor force for the next hundred years be thus misspent, or shall it be used on roads and public parks, or shall it be still kept in competition with honest men who pay taxes and rent ~~and~~ support their families? I have by me the "Act for Making an Artificial Road from the City of Philadelphia to the Borough of Lancaster," and as this was the first turnpike in the United States, it would be of interest to cull some items from it. He was a man of tremendous courage who first suggested the idea of making *a stone road for seventy-five miles*!—as grand a conception for that era as it was in 1861 to conceive the idea of making a trans-continental railroad. The artificial road act authorized the president, managers and company "to erect such and so many gates or turnpikes upon and across the said road as would be necessary and sufficient to collect the tolls and duties," and to "appoint toll-gatherers to collect the tolls;" and, if necessary, to stop persons "until they shall respectively have paid the same." Then follows the rates for each ten miles on cattle, sheep and hogs, horses, pleasure wagons and "chariots;" then it proceeds: "for every cart or wagon, whose wheels do not exceed the breadth of four inches, one-eighth of a dollar for each horse drawing the same; for every cart or wagon, whose wheels shall exceed in breadth four inches, and not exceed seven inches, one-sixteenth of a dollar for every horse drawing the same;" those which "shall roll more than ten inches, five cents for every horse." * * "Those which shall roll fifteen inches, three cents for every horse;" and it was further enacted that "no wagon or other carriage with four wheels, the breadth of whose wheels shall not be four inches, shall be drawn along the said road between the first day of December and the first day of May following with a greater weight thereon than two and one-half tons, or with more than three tons during the rest of the year." Seven inch wheels might carry from three and a half to four tons. Ten inch wheels might carry five to five and a half tons. No cart or two-wheeled carriage with wheels less than four inches should carry more than one and a quarter to one and a half tons; with wheels seven inches, two and a half to three tons. Ten inch wheels three and a half to four tons. The company also exer-

cised the right to have weigh scales at the toll gates and to compel wagons to drive on these scales so as to regulate the toll. Thus in 1792 the State of Pennsylvania and this (for the time) great corporation recognized the fact that there should be a relation between the width of the tire and the weight of the load. Now it is evident that a cycle or a buggy with two people exercise no destructive influence on a stone road; while a heavy load on a narrow wheel cuts through the surface metalting like a plough and lets water down into the substratum of the road.*

It was "further enacted that the said company shall cause posts to be erected at the intersection of every road falling into and leading out of the said turnpike, with boards and an index hand pointing to the direction of such road; on both sides whereof shall be inscribed in legible characters the name of the town, village or place to which such road leads, and the distance thereof, in computed miles." We may score another for the wisdom of our Pennsylvania forefathers.

And it was still further enacted that "the said company shall cause mile-stones to be placed on the side of the said road," etc. Score again for the fathers.

And now as I come to the end of this most interesting act I find I am writing within a day, April 8th, of a century from its approval. "Approved April the ninth, 1792. *Thomas Mifflin*, Governor of the Commonwealth of Pennsylvania."

I sum up by urging, first, convict labor for the commonwealth and not for private greed; second, broad tires for heavy loads.

*John W. Forney once told me that when he attended the Chamber of Deputies in Paris, the members occupied two days in discussing the proper width of tires for wagons.



A WORD OF CONTRAST.

By Charles Kendall Adams, LL.D., President of Cornell University.

To an American visiting Europe there is nothing more impressive than the general excellence of the roads. Their climate is more rainy than ours, and their roads, under the same conditions, would probably be even worse than those usually met with in America. But in England, in France, in



CHARLES KENDALL ADAMS.

Germany, and in Switzerland, everywhere one goes, the excellence of the roads is a constant source of surprise to one visiting those countries. During the last Summer it was my fortune to take a long drive in the Alps. The party was made up of six persons. A coach was employed for the whole trip. We were thirty-three days in the coach, and during that time we went over four of the great passes and traveled nearly a thousand miles. But the matter of chief significance to those interested in good roads is the

fact that, although we drove from twenty-five to fifty miles a day for more than a month in these mountainous regions, the whole trip was done with one team of horses. No change was made, and none was needed. More than that, it was our opinion that the horses were in better condition at the end of August than they had been at the beginning of the trip, a little after the middle of July. Could there be any more significant commentary on the quality of the roads? What would be the condition of a team of horses in Midsummer in America which had been driven over mountain roads at the rate of from twenty-five to fifty miles a day for six days in a week?

ASPHALT AND ITS USES.*

By Col. F. V. Greene, New York City.

Of all the materials used in construction I think it may fairly be said that the one more nearly indispensable than any other is cement. The sticking or binding material, which causes the larger masses of sand, stone or brick to adhere and hold firmly together is, and always has been, so

universally employed that we can hardly conceive of any permanent structures erected without it.

There are two general classes of cements, viz., hydraulic and bituminous.

Bituminous Sandstones.—The bituminous sands and sandstones of France yield, on analysis, from 5 to 13 per cent. of bitumen, mixed with sand and a small amount of limestone and clay. They have been principally used for the purpose of extracting the bitumen. The process consists in boiling with water at a temperature which fuses the bitumen and allows the sand to settle to the bottom; the water is then evaporated from the scum or froth and the



COL. FRANCIS V. GREENE.

bitumen is left as a deposit. The greater portion of this supply has now been exhausted.

The bituminous sandstone of California is found in large quantities at various points between San Francisco and Los Angeles. It contains about 12 to 18 per cent. of bitumen, and the rest is quartz sand, in grains about one-tenth of an inch in size. The material is sufficiently soft to yield to the heat and pressure of the hand. Within the last few years it has come into use for paving purposes in Los Angeles and other cities on the Pa-

*From a paper read before the American Institute of Mining Engineers.

cific coast. The rock is quarried, broken to fragments of about two inches in size, heated in kettles by steam (which causes it to fall into powder), and then, while still hot, taken to the street and compressed by rolling or tamping. None of the pavement has been laid on a large scale for longer than two years, and the reports as to its quality as a paving material are conflicting. It appears to be so soft that wheels and horses' feet sink into it quite deeply, but, on the other hand, these marks appear to be more or less obliterated by the next passing vehicle.



SCENE IN PARIS. WASHING STREET PAVEMENTS.

Bituminous Limestones.—The bituminous limestones of France have furnished the material with which portions of the streets of Paris and other European cities are paved. The best mines are those of Seyssel and Val-de-Travers. They are of uniform quality, and yield on analysis about 10 to 11 per cent. of bitumen, the rest being pure carbonate of lime, free from clay or other impurities. The extent to which the material has been used for paving roadways is about as follows: In Paris, 13 miles; in London, 15 miles; in Berlin, 9 miles; in other cities, 10 miles; total, 47 miles.

It was introduced into Paris about thirty years ago and has proved a durable material, with the qualities pertaining to a smooth pavement. The chief objection to it is its slipperiness. The limestone, which forms nearly 90 per cent. of its volume, is not granular, but amorphous, and it polishes under traffic, so as to become at times dangerous for horses.

The sidewalks of Paris are also paved with a preparation known as asphalt mastic, which is made in the following manner. The rock, after being reduced to powder as above described, is placed in cylindrical kettles, in which about 8 per cent. of Trinidad asphalt has previously been placed and melted. The mass is stirred by revolving arms and agitators, at a temperature of about 280° F., for about five hours. It is thus thoroughly "cooked," and is then run out of the kettles into moulds, where it cools in the form of cakes or blocks, weighing about fifty pounds each. These are sold in commerce. To use them on the street the material is again heated in a suitable kettle in the following proportions:

Mastic cakes (broken to egg size),	-	-	-	60 pounds.
Trinidad asphalt,	-	-	-	4 "
Fine gravel and sand,	-	-	-	36 "
				—
				100 pounds.

This is "cooked" for about two hours at a temperature of about 300° F., great care being taken constantly to stir the mixture. It is then taken out of the kettle by the bucketful and poured on the foundation previously prepared for the sidewalk, its consistency being such that it will flow very slowly. It is then spread by means of wooden trowels, and compressed and smoothed by rubbing, as in plastering.

These sidewalks have given great satisfaction in Paris, and are almost universally used throughout the city. Their superficial area is nearly 5,000,000 square yards (about fifteen times as great as the area of the asphalted streets), and their length probably exceeds 1,000 miles.

The bituminous limestones of Germany, Sicily and Spain are of the same general character as those of France, but they are inferior in quality, since they are not so homogeneous or so uniformly impregnated with bitumen. Samples of a similar kind of limestone have been found in various parts of the Rocky



REPLACING CUBAN ASPHALT WITH TRINIDAD ASPHALT ON THIRD STREET, LOUISVILLE, KY.

Mountains, but they have not as yet come into general use for paving purposes, and it is probable that the expense of transportation will prevent their introduction to any great extent.

The bituminous limestones of Mexico and Cuba contain about 70 per cent. of bitumen, mixed with limestone, sand and other impurities. They have not come into general use for paving. It is found that, on partial reduction, the bitumen from this and other sources can be resolved into two substances, to which the names petrolene and asphaltene have been given, the



SCENE AT PITCH LAKE, TRINIDAD, SHOWING NATIVE SINKING SLOWLY IN SOFT ASPHALT.

petrolene being soft and resembling petroleum, and the asphaltene being hard and resembling asphalt.

In the Cuban rock the asphaltene is too largely in excess to make a good cementing material. A pavement laid with Cuban asphalt in Washington, under guaranty of maintenance, was taken up by the contractor at the end of a year and relaid with Trinidad asphalt. In Louisville a pavement of Cuban asphalt was laid in 1882. Between one-third and one-half of it has been taken up and relaid with Trinidad asphalt, and what remains is

everywhere cracked and shattered like a broken pane of glass. This material is evidently too brittle for a good paving cement. It is also so situated geologically that its mining is very expensive.

Trinidad Asphalt.—The asphalt of Trinidad is found in a so-called "lake," situated about 100 feet above the sea, and about three miles from the shore of the island, at the village of La Brea (the Spanish word for pitch). Its area is about 114 acres; its depth, as far as ascertained by certain rude borings, is reported to be about eighteen feet at the sides and seventy-eight feet in the center; and underlying it there is said to be a bed of blue clay. If these figures are correct, the lake contains about 6,000,000 tons of asphalt. Whether these borings are even approximately accurate is, however, very doubtful. It is even contended by some that the lake is still fed from underground sources. The only positive information on the subject is the fact that the excavations of the last ten years, amounting to about 180,000 tons, have not appreciably lowered its level; and for all practical purposes, at the present rate of consumption, it may be said to be inexhaustible.

The word "lake," applied to this deposit, is an entire misnomer. It is a level tract of brownish material having an earthy appearance. Cracks or fissures, having a width and depth of a few feet, appear here and there over the surface. Some of them are filled with rain-water, while others have been filled with soil blown there by the wind, and giving support to a scrubby vegetation. Some travelers have reported that the deposit is liquid in the middle, but such is not the fact. Carts and mules can be driven everywhere on its surface.

The material is dug with a pick and shovel, loaded into carts, and hauled to the beach. Here it is placed in baskets, which are carried by coolies wading through the surf to lighters, and from these lighters it is loaded on vessels. During the voyage the material unites into a solid mass, and has to be removed again by the use of the pick and shovel. On being unloaded it is placed for about five days in large tanks heated by a slow fire. The moisture is expelled, the roots of trees and other vegetable matters are skimmed off the surface, the earthy matter with which it is combined settles by gravity, and the refined product is run off into barrels. This refining is in reality



PITCH LAKE ASPHALT ON BEACH AT TRINIDAD WAITING SHIPMENT.

a mere heating to a liquid condition, in order to allow the sediment to deposit; and great care is taken not to heat the material to a point which will in any way change its chemical condition or produce distillation.

The Principal Uses of Refined Asphalt.—These are as follows:

1. As a varnish or paint. 2. As an insulating material. 3. As a water-proofing material. 4. As a cement in ordinary construction. 5. As a cement in roofing and paving compounds.

For all of these purposes it is, in its natural state, too brittle at ordinary temperatures. It is, therefore, treated or tempered with some form of oil, the kind of oil and the amount used depending on the purpose to which it is to be applied. For a thin varnish it is mixed with one-third of oil of turpentine and one-sixth of shellac. For paving-cement it is mixed with one-sixth of petroleum residuum. This cement is also suitable for coating water-pipes; but as these are not subject to atmospheric influences, they are usually coated with coal-tar residuum. An insulating material for electric cables, called bitite, is made

by the Callender Insulating Company. Its exact composition is not known, but the principal ingredient is asphalt. Asphalt paving-cement is also used to imbed naked copper wires for electric lighting. Mixed with sand, in substantially the same proportions as for paving, asphalt has been used to make electrical conduits on the "drawing-in system." As to the importance of using a non-conducting material in such conduits, in which insulated wires and cables are to be placed, electrical experts



LOADING ASPHALT AT PITCH LAKE, TRINIDAD.

are divided in opinion. A serious objection to the use of such material in the streets of New York is the escaping steam from steam-heating pipes, which frequently raises the temperature of the surrounding earth to over 250° F., at which temperature the conduit loses its shape under pressure. Where such pipes are not laid these conduits are believed to be entirely satisfactory.

In masonry construction, for the reasons stated at the beginning of this paper, bituminous cement is used only in those cases

in which rigidity is undesirable and impermeability to water is necessary. A notable instance of this is the brick arch spanning the large wrought-iron water main on the High Bridge over the Harlem River in New York. It was essential that this arch should be water-proof; and as its length is 1,381 feet, a ductile cement was indispensable on account of expansion and contraction. The Chief Engineer (Gen. G. S. Greene) used a cement mortar, made of Trinidad asphalt with the addition of 10 per cent. by volume of coal-tar residuum and 25 per cent. of sand. The arch was a segment of a circle, of radius twenty-nine feet six inches, and span seventeen feet, the thickness being twelve inches, composed of three courses of bricks. The first two courses were laid on edge with ordinary mortar of hydraulic cement and sand. On the second course a layer of the asphalt-cement mortar was laid to the thickness of half an inch. On this, while still hot, the third course of bricks was laid flat, the bricks being dry and hot, and dipped in hot asphalt before laying. The joints were then filled with hot asphalt, and finally a course of pressed brick was laid in flat hydraulic cement mortar, forming the paving and flooring of the bridge. The work is nearly thirty years old, and has never leaked a drop.

Another noticeable instance is the La Salle Street tunnel under the Chicago river, the arch of which was laid with asphalt cement. The tunnel has always been perfectly dry; whereas the Washington Street tunnel, under the same river, the arch of which was laid in hydraulic cement, has always leaked so badly that at times the tunnel cannot be used at all.

For the purpose of preventing dampness in cellars, the same form of construction, using two thicknesses of bricks dipped in asphalt while hot, and separated by a layer of asphalt, is entirely successful.

The usual method of covering arches with a continuous sheet of asphalt is not always successful, as there is an unequal contraction in the asphalt and the masonry with which it is in contact, which results in cracks. By using asphalt as the cement between heated bricks, this difficulty is avoided, since the contraction in a single joint is almost infinitesimal.

A special form of damp course is also made by saturating hemp, canvas or felt-paper with a mixture of asphalt and very fine sand.

Of the use of asphalt in foundations, two very interesting examples are given by W. H. Delano, in a paper read before the English Institution of Civil Engineers in 1880. One was the foundation of a rock-disintegrator, running at a high rate of speed. It was first built upon a foundation of ordinary concrete. On the opposite side of the street was an establishment for painting on glass and china, where fine grades of work were required. The vibrations from the disintegrator were so great that the business of the glass painter was rendered impossible. He threatened suit for heavy damages, whereupon the foundations of the disintegrator were removed and rebuilt in bituminous concrete. The result was entirely successful, the vibrations becoming imperceptible. The second case was the foundation of a large trip-hammer, weighing forty-five tons, which was erected at the Paris Exposition of 1867. In order to reduce the concussion, this was built in bituminous concrete, and with entire success. At the close of the Exposition, the concrete was so tough that it was found impossible to make any impression on it with a pick or chisel. As blasting was not permitted, the foundation had to be left in position, and it is believed to be still there.

In all of these cases the concrete was made from the mastic cakes described under the head of Bituminous Limestones in the preceding portion of this paper. The proportions were 60 per cent. of broken stone and 40 of gritted asphalt-mastic (see p. 301). It was tamped between wooden frames, secured by iron cross-bolts, and these bolts were left in the material. An equally good concrete can be made with asphaltic paving cement, mixed with two parts of sand and four parts of stone in an ordinary concrete mixer. It is believed that such a concrete, with a thin facing of steel, would make a very tough and durable wall for fortifications.

Of all the uses made of asphalt by far the most important is the paving of roadways.

During the last twelve years, upwards of 3,500,000 square yards of genuine asphalt pavements have been laid in the United States. They extend over a length of more than 200 miles, and are used daily by probably 50,000 vehicles. The cubical contents of the asphalt surfaces are over 7,000,000 cubic feet. With their foundations of concrete, the total contents are nearly



VIEW OF ASPHALT PAVEMENT ON SUMMER STREET, LOOKING FROM DELAWARE AVENUE, BUFFALO, N. Y.

23,000,000 cubic feet and weigh a million and a half tons. The great pyramid of Cheops is not quite four times as large. It is supposed to have occupied the labor of an army of men for one or more generations, and has been the wonder of the world throughout recorded history. It is significant of the resources of the nineteenth century in mechanical appliances that an equal amount of material could now be handled in a few years, in a single industry, without attracting any attention.

The city of Buffalo has now the distinction of possessing more asphalt pavements than any city in the world, though the combined area of the asphalt and the tar pavements in Washington is still greater by about 50 cent. The area of asphalt here is 1,000,248 square yards, extending over a length of 51 miles, more than the combined area of all the asphalt roadways in Europe.

The form of construction which has usually been followed is a rigid foundation of ordinary concrete, six inches thick, on

which the asphalt wearing-surface is placed. In some instances, the foundation is of bituminous concrete. Each form of foundation has its advantages and disadvantages. The ordinary concrete has an excess of strength for the purpose, and the bituminous concrete is doubtless strong enough. With ordinary concrete, the bond between the foundation and the wearing-surface is not very great; hence, it is very easy to strip off the surface in case repairs are necessary; but, on the other hand, the surface sometimes slips on the foundation, and, under



LAYING ASPHALT ON THE CONCRETE, CHIPPEWA STREET, BUFFALO, N. Y.

traffic, rolls into waves and irregular surfaces, and sometimes cracks with sudden and great changes of temperature. With bituminous concrete, the foundation and wearing-surface are united into one mass and cannot easily be separated. Repairs are more difficult, but waving and cracking are less frequent. The bituminous concrete is less expensive. As it is not exposed to the atmosphere, coal-tar residuum can be used in place of asphalt as the cementing material, and a strong concrete can be easily made by simply spreading the stone, compacting it with a roller and pouring hot tar over and into it. It is not generally known how strong such a concrete becomes with age.

As an example, I may cite a case which fell under my notice in Washington some years ago. I was driving over such a pavement one day, when I noticed a small hole, about the size of a horse's foot. On probing it with a cane, I discovered that I could not touch the bottom. I immediately had the pavement opened, and was astonished to find a cavity about twenty by forty feet in extent and from four to five feet deep. The earth from this had been washed into a defective sewer; and it must have taken months, if not a year or more, for this to occur, for the hole in the sewer was quite small. During all this time the pavement was simply a concrete arch, six inches thick, and having a span of about twenty feet; and yet it had sustained the traffic until finally a horse broke a small hole in it. The traffic was infrequent; but at times heavy ice and coal carts passed over it. The pavement was about ten years old.

Whatever the form of foundation, it is desirable that the surface should be cemented with asphalt without the use of any product of coal tar. The reason for this has already been given, viz., that the products of coal tar are subject to oxidation by the atmosphere, which in time renders them brittle and friable and devoid of any cementing qualities. The asphalt of Trinidad is not subject to this defect, for the reason that it has been exposed for centuries to the burning sun of a tropical climate, and the atmosphere can have no further effect upon it. It is a stable compound, and its cementing qualities are proof against any atmospheric influences. I am aware that one of the pavements in Washington, in which the cementing material was a mixture of tar and asphalt, has proved successful after fifteen years' use. But, on the other hand, of other pavements laid by the same parties, at the same time and under the same specifications, some had to be resurfaced with asphalt after a few years' use and others are now in a deplorable condition.

With the asphalt as a cement is combined the proper proportion (about 7 to 1 by weight or 4 to 1 by volume) of fine, sharp sand, ranging from one-twentieth to one one-hundredth of an inch in size. The two materials are thoroughly incorporated by suitable machinery at a temperature of about 300° F., and the plastic composition is taken to the street while still hot, spread on the foundation by means of hot iron rakes and compacted by tamping and rolling. The result is a compact, durable sandstone of fine, uniform grain, with a slightly granular

surface, the advantage of which will be subsequently referred to. The bituminous nature of the cement makes the stone somewhat elastic, or, more properly speaking, ductile, and enables it to resist the heavy blows of horses and wheels without breaking. A rigid pavement of Portland cement-concrete, recently tried in New York, lasted just five months before it was removed. The first holes appeared in three weeks.

Of the various compositions for roofing or paving, in which asphalt or coal-tar residuum is the cement, the name is legion. A digest of the patents for these compositions, issued about twenty years ago, shows several hundred of them. It is not believed that any of these patents had any value. The virtue of the composition depended on the quality and quantity of the



PIECE OF TRINIDAD ASPHALT PAVEMENT.

Taken out of Linwood Avenue, in Buffalo, after six years' constant use. The photograph was taken in 1888, but the pavement is now (1892) in the same perfect order as when the photograph was taken.

asphalt or the tar used, and all the other substances introduced (except the sand which formed the body) were useless or worse. In the asphalt pavement the specifications have usually called for a certain amount of powdered limestone to be mixed with the sand. This was used mechanically, not chemically, for the purpose of filling the voids in the sand, absorbing the free asphalt in the voids and making a more compact and homogeneous compound. All of this can be accomplished by the sand itself, if part of it is sufficiently fine.

I have referred to the granular surface of the Trinidad asphalt pavement. The importance of this is very great in affording a foothold to horses and diminishing the slipperiness which any uniform surface must have to a greater or less degree. By

passing the finger over two samples, one of the natural bituminous limestone (or French asphalt) pavement and the other of the artificial bituminous sandstone (or Trinidad asphalt) pavement, the difference is very noticeable. It is the difference between fine sandpaper and polished marble. The difference in practice was shown by careful comparative tests, made in the Autumn of 1885, on two pieces of the respective pavements on the same street in New York. Out of a total of over 36,000 horses passing in six days, five fell on the Trinidad asphalt (sandstone) and ninety-five on the French asphalt (limestone). A series of comprehensive tests was made at the same time on different pavements in various cities in the United States, which showed that under all conditions of weather and climate fewer horses fell on asphalt than on stone pavements, confirming the result of similar tests previously made by Colonel Haywood on the streets of London.

The pavements which I have just described are not the only pavements in which asphalt is used. Having an unbroken monolithic surface they (in common with the pavements having a similar surface in which coal tar is used as the cementing material) have sometimes been called "sheet" pavements, to distinguish them from "block" pavements made of asphalt. The latter are made of crushed limestone, in size from $\frac{1}{4}$ -inch to dust, mixed with ten per cent. of asphalt-cement. As the mixture leaves the mixing apparatus it passes into a press not unlike a brick machine, and is there moulded and compressed into blocks 4 x 5 x 12 inches in size. These blocks are cooled and can then be handled at any ordinary temperatures. They are laid on the street, in the same manner as stone blocks or bricks, to form a pavement. They have the advantage over any monolithic or "sheet" pavement of being made at a factory, whence they can be transported to the point where required and laid by ordinary paviors without the aid of skilled labor, whereas sheet pavements require special machinery and skilled labor in each city where they are laid. The asphaltic blocks are also much smoother and less noisy than stone block pavements, and they are practically waterproof, because the joints are so narrow that, under the sun's heat and the traffic, the asphalt cements the blocks together. On the other hand, they are less durable than the other pavements named.

It has been found impossible to use sand in the manufacture of these blocks, as it cuts the moulds. Hence, limestone is used to form the body of the block, and this wears rapidly under heavy traffic. On residence streets, however, where travel and traffic are light, they have given great satisfaction, and more than 500,000 yards, or about twenty-five miles, of them have been laid during the last ten years.

In conclusion, I trust it will not be considered out of place if I call attention very briefly to some of the merits of asphalt pavements and their effects upon cross-city transportation. I shall not speak of the comfort of driving over a smooth uniform surface, or of the advantage to health of a pavement which has no joints to collect street manure when it rains, and then blow it into our lungs with the next sunshine and breeze, or of the saving of wear and tear on the nervous system by getting rid of the "mighty roar" of stone pavements. These considerations are quite well understood, and it is generally considered that an asphalt pavement is an agreeable luxury for residence streets. It is not so well known that the cost of maintenance is a mere function of traffic, and that where the traffic is heavy and the cost of maintenance apparently large, the corresponding saving in traction force and in wear and tear of vehicles is still greater. The statistics and figures necessary to establish this fact are too long and complicated to be given here. But it is susceptible of direct proof that if we count the cost of paving any large city, like New York, for example, with asphalt, and maintaining it at the cost shown by years of experience under varying weights of traffic, and then count the saving in the cost of transportation and wear and tear of vehicles, it will be conclusively shown that the saving effected is very nearly three times the cost. This will not appear so remarkable when it is remembered that the transportation through the streets of New York is something over 40,000,000 ton-miles per annum, costing over \$15,000,000, and that the repairs of 30,000 vehicles and the shoeing of its 40,000 horses cost nearly \$4,000,000 in addition per annum.

The force that draws one ton over a stone block pavement can draw three tons over asphalt, and the cost of repairs of vehicles and horses can be reduced about one-quarter by the use of smooth pavements. The saving thus effected in both

directions runs, as will be seen at a glance, into the millions of dollars per annum. When these facts come to be more widely known it is not improbable that smooth pavements will cause a revolution in the methods and cost of transportation within cities, second only in importance to the change effected by railroads in transportation between them.

TO TELL A HORSE'S AGE.

To tell the age of any horse,
Inspect the lower jaw, of course;
The sixth front tooth the tale will tell,
And every doubt and fear dispel.

Two middle "nippers" you behold
Before the colt is two weeks old,
Before eight weeks two more will come:
Before eight months the "corners" cut the gum.

The outside grooves will disappear
From middle two in just one year,
In two years, from the second pair;
In three the corners, too, are bare.

At two the middle "nippers" drop;
At three the second pair can't stop.
When four years old the third pair goes;
At five a full new set he shows.

The deep black spots will pass from view
At six years from the middle two,
The second pair at seven years;
At eight the spot each "corner" clears.

From middle "nippers" upper jaw
At nine the black spots will withdraw.
The second pair at ten are white;
Eleven finds the "corners" light.

As time goes on, the horsemen know
The oval teeth three-sided grow;
They longer get, project before
Till twenty, when we know no more.

THE STREETS AND ROADS OF WASHINGTON.

*By Frank L. Dyer, Chief Consul, District of Columbia Division,
L. A. W.*



LEAN, spacious and attractive at all times, the streets of Washington are conspicuously beautiful in Summer. Ample foliage, broad lawns and attractive buildings, public and private, serve everywhere to attract and interest the visitor, and lend pleasing contrast to the smooth, gray concrete roadways and the clean brick sidewalks which run in all directions through the city. These streets, and some of the beautiful suburban driveways into which they extend, have added to the fame of an already famous city. They present an almost perfect surface for all kinds of wheeled vehicles and link together many points about which clusters much of the tragedy and romance of American history.

These same streets, so scientifically constructed and so perfectly maintained, are at best a modern institution, and should the visitor of to-day have had the misfortune to be quartered in Washington during the Civil War, when heavy, black Southern mud prevailed in every roadway, when a paved resident street was almost unheard of, when cows, pigs and hens were allowed "the freedom of the city," and when a sluggish, dirty little stream, called the "Tiber," flowed uninterruptedly past the



FRANK L. DYER, CHIEF CONSUL,
WASHINGTON, D. C.

Patent Office, the transformation which he now observes might well be considered marvelous. The origin of Washington, compared with that of other important cities in this country, was unique, since everything had been carefully planned, every street and avenue scientifically laid out, and every park and circle located before the town contained a single inhabitant, unless we except the nineteen land owners, whose estates had been more or less included in the limits of the new city. The scheme thus carried out of building a "paper city," and which originated, in all probability, in the founding of Rome, has been by no means neglected in later years, and there are to-day many towns in the West which have been laid out, more or less successfully, on this same plan.

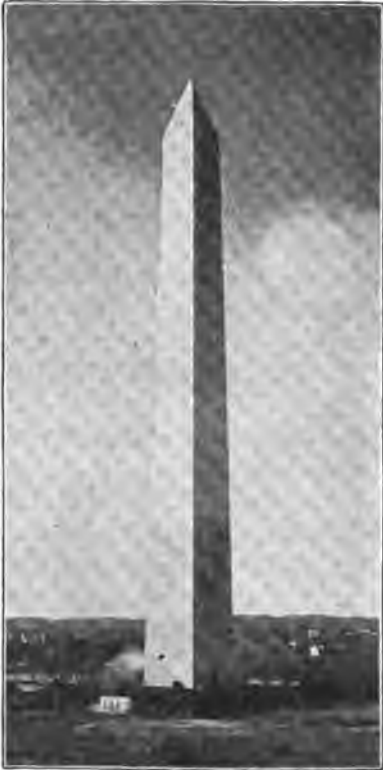
On May 16, 1800, President John Adams issued an order directing the removal of the minor employees and official records from Philadelphia (which had been the Capitol since 1790) to the new "Federal City," as Washington was then called; but it is surmised that something must then have been known of its unattractiveness, both from an æsthetic and from a hygienic standpoint, for it was not until the next October that the President's order was carried out. In a certain sense, therefore, Washington was first inhabited by compulsion and not by choice. Being for the most part below tide-water, and located in an extremely swampy section of the country, the condition of its streets, if such they could be called at that time, can well be imagined.

In those days there was in Congress a philosophical member from Connecticut named Andrew Wolcott, who, filled with misgivings regarding the policy of the Government in trying to create a mushroom city as the city of federal affairs, celebrated the anniversary of independence by writing a letter to his wife on July 4th, 1800, in which occurs these words:

"I do not perceive how the members of Congress can possibly secure lodgings unless they will consent to live like scholars in a college or monks in a monastery, crowded ten or twenty in one house and utterly secluded from society. The only recourse for such as wish to live comfortably will, I think, be found in Georgetown, three miles distant, over as bad a road in Winter as the clay grounds near Hartford."

Viewing the city as he then did, it would have required a

mind more prophetic than his to foresee the ultimate destiny of the Capitol. Little could he have imagined that there would be a time like the present, when Georgetown, which was then one of the most important cities of the country, would be overshadowed by and finally added to the "village," which was so small that it could hardly supply lodgings to the legislators of the



THE WASHINGTON MONUMENT.
HEIGHT 555 FEET.

United States, and that the road, scornfully referred to as being as bad as the "clay grounds near Hartford," should develop into the magnificent Pennsylvania Avenue, one of the finest streets in the world, having a width of 160 feet, and with a surface as smooth as a billiard table and as clean as chiseled stone.

Mr. Wolcott's colleague, John Cotton Smith, also adds his complaint regarding the new city in an article written a little later, in which he says: "Instead of recognizing the avenues and streets portrayed on the plan of the city, not one was visible, unless we except a road with two buildings called the New Jersey Avenue."

The Pennsylvania Avenue leading, as laid down on paper, from the Capitol to the President's Mansion, was then

nearly the whole distance a deep morass, covered with alder bushes, which were cut through the width of the intended avenue during the ensuing Winter. The roads in every direction were muddy and unimproved. Viewing the city as it now is, it is indeed difficult to even imagine the condition of affairs described by these writers.

The various names which were applied to Washington eighty

or ninety years ago by the different statesmen residing there, illustrate well the contempt with which the city was regarded. By some it was called the "Wilderness City," by others a "Capital of Miserable Huts" and a "City of Streets without Houses;" but it remained for one eloquent speaker to bestow upon that maligned village the crowning appellation of all. He said it was "a mud-hole, almost equal to the great Serbonian Bog."

Washington's hopes for future glory and greatness were small indeed, when, paradoxical as it may appear, it had the fortune to meet with a misfortune, after which a new, rapid and final growth was destined to set in, as it was the case with Chicago sixty years afterwards.



PRESIDENT'S MANSION, "THE WHITE HOUSE."

The War of 1812 found Washington a struggling little city of ten thousand people, apparently in a condition of stagnation, and the invasion and destruction of almost the whole town by the British in 1814 under Ross, by whom the Capitol and White House were sacked and burned, resulting in the loss of more than three million dollars' worth of property, public and private, was a calamity which was thought to be the death blow of the city. But such was not the case, and from that time until 1870 may be termed the period of reconstruction, for in this period improvements of all kinds took place. The Capitol, Treasury, Interior Department, Post Office Building and "White House"

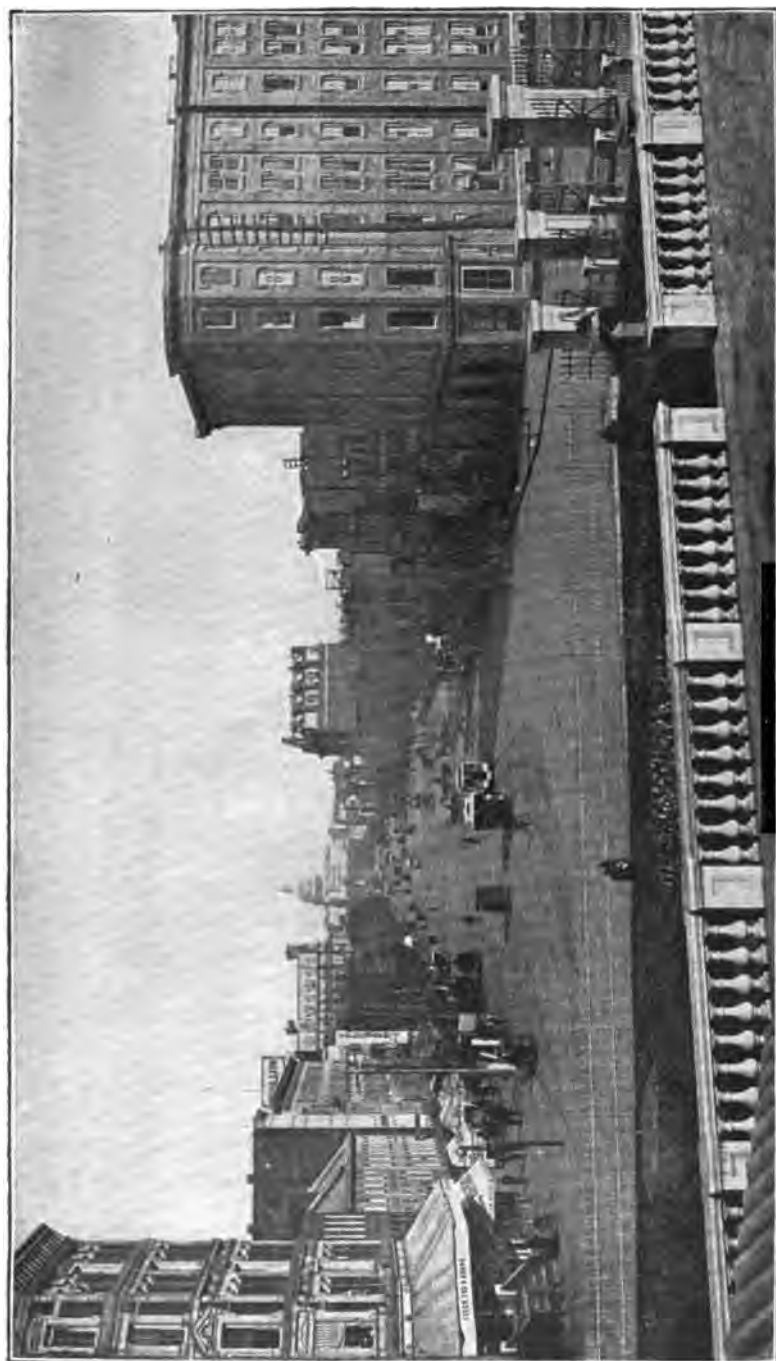
were either wholly or nearly finished. The Washington Monument had reached a height greater than that of Bunker Hill, and parks adorned by flowers, fountains and statues were found on all sides.

But while all this work had been going on and millions of dollars had been spent in the erection of splendid buildings and the laying out of public grounds, the hand of the Government had been withheld from the care of its streets which, in Washington of all cities in the country, had great need of improvement. Their condition at certain seasons is said to have been shameful.

The roadways running between the imaginary street lines which extended in the early days of the city, are said to have been little better than deep quagmires—the legitimate result of the unhappy position of the city itself. They were bottomless, and wholly without a sustaining surface which in any way qualified them for even the limited traffic which the necessities of the city required at that time; and old-time residents compare the streets of early Washington history with those encountered by the Union troops in Virginia during the Civil War, when it took six horses to drag an ordinary howitzer a few weary miles each day. The idea of grading these streets was unheard of, and Washington might be said to have had as many ups and downs to its surface as to its varying fortunes.

The White House and Capitol were fifteen and ninety feet respectively above tide-water, while Pennsylvania Avenue, which connects them, was below it. Two hundred and sixty rods west of the White House was Observatory Hill, ninety-six feet above the tide, and connecting this with Capitol Hill and extending slightly northward was a ridge having an elevation of one hundred and three feet. Shade trees were scarce, and these were arranged in the most imperfect order; the sidewalks were only crude imitations of the real article, and no attempts had been made towards bettering the condition of the public roads in the mall and parks. Cows roamed at large over the whole city and browsed in the front yards of the citizens. Pigs wallowed in the muddy streets, causing even the President to turn out for them, and hens and chickens cackled and scratched and wandered everywhere.

Running down from the northwest into the business portion



VIEW OF PENNSYLVANIA AVENUE.

of the city, where the finest stores now stand, was a sluggish, muddy creek, at first dignified by the classic name "The Tiber," but soon reduced to the commonplace and menial office of serving as a natural open sewer for the surrounding district. "The Tiber" is supposed to have received its name from one of the early settlers named Pope, whose plantation on the top of the hill where the Capitol now stands was called Rome, in the belief that in the course of time an American capital greater than the Roman would arise on the site of his possessions. The entire western section of the city, extending from the river to Meridian Hill and Rock Creek, was for the greater portion a trackless marsh; and some of the oldest inhabitants recollect to-day that years ago in rainy weather the mules and horses passing up Pennsylvania Avenue would often sink to their backs in the mud. There were no constructed sewers, neither was there water nor gas in that whole great section which to-day constitutes not only the business section, but the fashionable portion of the city. These were the conditions that awaited the advent of Alexander R. Shepherd, who, in 1871, undertook the task of making Washington what it should be and what it now is, the most beautiful city in the world. "Boss" Shepherd, as he was called, by reason of the fierce energy displayed in his methods, and by reason of his indomitable will and perseverance, is said to have "lifted Washington out of the mud." Beginning by first covering the Tiber, which now flows for some distance under the city, he next laid sewer and water pipes throughout the entire northwestern section of the city. Then followed the filling in of the marshy sections and the raising of the streets to proper grades, after which Shepherd turned his attention to the most important subject of all, the proper pavement to be employed for the streets and avenues.

During a period of two weeks, in the Spring of 1872, the Washington Board of Public Works, of which Shepherd was then chairman, sat in conference with the Park Commissioners of New York, Brooklyn, Philadelphia and Buffalo; and jointly examined, tested and considered pavements of all kinds, after which the Board visited Boston and western cities with the view of thoroughly investigating the various systems employed in the construction of streets. The complete investigation which was thus afforded them resulted in the laying of fifty-eight and



FORT MYER ROAD. SCENE NEAR THE FORT ENTRANCE.

one-half miles of wood block pavements, twenty-eight and one-half miles of asphalt, and ninety-three miles of cobble, gravel and macadam, and the success or failure of each or all was to be carefully noted. Time developed the fact that the wood block pavement was entirely unfit for the purpose, since, owing to the many warm rains in Winter, the blocks became quickly rotted and destroyed, and a few years ago witnessed the last section of this variety of pavement give way to the more durable and satisfactory asphalt. From the practical test which was thus applied it was further discovered that a stone pavement was best suited for streets having heavy traffic (of which there are comparatively few in Washington), and to-day this pavement stands in as perfect condition as when it was first put down. Macadam and gravel roads were found to be more appropriate for the mall and parks, where the suburban effects of trees and flowers were heightened by the use of a smooth gravel road surface. But the greatest success of all was obtained from the asphalt, in which was found a pavement par excellence. Perhaps for some cities having heavy traffic such a pavement might be in a degree unsuitable, but for Washington it has filled every possible want. Its durability is unquestioned, since there is but moderate traffic, and that is made up principally of pleas-

ure vehicles, owing to the fact that Washington is strictly a political and social, and not a manufacturing city. Since the surface of these asphalt pavements is yielding to a certain extent, the noises of hoofs and wheels are almost entirely muffled, while a pleasant and agreeable footing is offered to horses. The climate of Washington is exceptionally well suited for these streets, since the weather is neither so cool in Winter as to crack them, nor so warm in Summer as to seriously melt them. It is true that in some Summer days the surface of the roadway softens to a slight degree, but this is only sufficient to allow any holes or bare places to be filled up. In a certain sense, therefore, these concrete streets are, in Summer, self-repairing. Up to July 1, 1890, there were 2,052,529 square yards of asphalt pavement in Washington, embracing sheet asphalt, coal tar and asphalt block, making a total length of about ninety-two miles. These streets, with but one or two exceptions, are in the north-western section of the city, west of North Capitol Street, and north of the Mall, and in this section there are not more than ten streets having a length of less than two miles which are not "asphalted," with the exception of Seventh Street, which is paved with granite block from one end to the other, a distance of four miles. The expense of creating this system of streets and maintaining them in perfect repair is enormous, and in the single year ending July 1, 1890, \$772,000 were expended in street improvements. Owing to the efficient system used in Washington for cleaning these streets they are really immaculate, and since this work is done at night, the streets in the daytime are always free from dust.

The most ardent advocates of asphalt streets of Washington are the many wheelmen who reside there, and whose number, according to conservative estimate, is fully 16,000. Of the 250,000 people who constitute the population of Washington, probably 150,000 are white, and of these there are possibly 60,000, or one person out of every four, who may fairly be said to be master of the "silent steed." Bicycles are seen everywhere, propelled swiftly, easily and noiselessly along, and, in contradistinction to the conditions in other cities, constitute not so much an element of pleasure as one of necessity. Business men ride to their offices and stores in the morning, returning at night on their wheels, and by the use of the wheel is given the rare lux-

ury to some of spending the noon hour, or a good portion of it, at their homes. Some of the more courageous ladies do their shopping awheel, speeding gracefully and fearlessly in and among the myriads of carriages and wagons which line the business streets. In the evening, too, when the air is cool, they ride over the country roads with husband, sweetheart and brother, perfect examples of health and happiness. The smaller element is by no means in the background, and little boys and girls mounted on their wheels spin over the smooth pavements with the ease and abandon of experts. Staid politicians and



CONDUIT ROAD BELOW DISTRIBUTING RESERVOIR.

statesmen cast aside their dignity for the nonce and obtain that recreation and exercise which tired nature demands.

The Congressman's Bicycle Club is now quite a flourishing organization of more than ten members, and numbers on its roll Honorable Jerry Simpson of Kansas (who is its president), ex-Speaker Reed and others. Washington is, indeed, a wheelmen's paradise.

The payment for all the extensive improvements inaugurated by Shepherd necessarily devolved upon the people of Washington, and plunged the city in debt to the amount of many millions of dollars. To extricate them from the embarrassment which

thus confronted them, extremely heavy taxes were levied, against which the citizens loudly complained. Insinuations of the unkindest character were reflected upon Shepherd and the Board of Public Works, and it was even charged that only those streets were improved which extended in proximity to lands owned or controlled by the members of the board. In those reconstruction days, Washingtonians were, indeed, short-sighted, for instead of foreseeing the future greatness of the Capitol, they had eyes for what to them was only an impending calamity. It must be remembered, however, possibly as an excuse for their subsequent action, that just then came the time of a national financial depression, caused by the Jay Cooke and kindred failures, which brought on the panic of 1873, and we can understand to a certain extent the cause of the united outcry of the citizens for lower tax rates. Notwithstanding the difficulties which lay in his way and the tremendous obstacles which he must necessarily have had to overcome, Shepherd continued quietly at his magnificent work until February, 1874, when a petition of taxpayers was presented to Congress, and, as a result, a joint select investigating committee was appointed, with Senator Hawley as chairman, to inquire into the labors and methods adopted by the Board of Public Works. This committee undertook its work thoroughly and systematically, conducting its labors in an impartial and public manner, and on June 16, 1874, reported in effect that what the board had done in two years should have required several years to perform. This report can be construed only as a compliment to the ability and energy of the indefatigable "Boss" Shepherd. But so far as honesty and sincerity were concerned not a single imputation was cast on the Board of Public Works nor any of its members. Opposed and maligned by the very people whom he was benefiting, Shepherd at last lost courage, and a few years after this he sought the mining fields of Mexico, a poor and disheartened man, practically an exile from home.

In opposing the laying of just and proper taxes by which the Capitol could be metamorphosed from a dirty, straggling southern town into the most beautiful city of the nation, its citizens were, indeed, impolitic, for to-day, should the principal cause of the wealth of Washington be inquired into, the invariable answer would be its splendid streets, and these streets, which not

only beautify the city beyond comparison with any other, have worked a wonderful influence on its real estate. Immediately after the War sales of real estate in one year amounting to a few hundred thousand dollars were considered good, but in 1873 more than twelve million dollars' worth of land changed hands. Prior to the advent of asphalt streets, a great portion of the northwesterly section of the city was a marsh, covered for the most part with water, and rank with reeds and rushes. In those days frogs croaked and desolation reigned where magnificent dwellings now stand. In that section land was worth sometimes as low as one mill a foot and seldom higher than ten cents a foot; but good streets, proper grades and perfect drainage have all worked miracles, and the same property to-day commands from five to ten dollars a foot, an increase in some cases of not less than ten thousand fold.

Since the time of Alexander Shepherd, the improvements of Washington and its streets have gone steadily forward. The marsh lands have been eliminated with few exceptions, most of the streets are asphalted and are in perfect condition, costly houses are everywhere seen, and the American citizen points to-day with pride to Washington as a fit and beautiful capital to the enterprising nation.

The roads in and about Washington, especially those extending to the north and west, compare favorably with its streets. The "Conduit Road," extending a distance of eight miles, from Georgetown to Cabin John Bridge (the largest single stone arch in the world), is a perfect example of scientific road construction. The Conduit Road proper commences at the vast distributing reservoirs, located on Georgetown heights, and extends for four miles past the distributing reservoir, a magnificent artificial lake, studded with islands and lined with green woodland borders. To the south for a number of miles, and in almost constant view of the road, flows the upper Potomac, a tumultuous and rushing stream, clear and sparkling, with many rocks and falls, and beautiful in the extreme. Extending parallel with the Conduit Road are the vast water mains, receiving their supply at Great Falls, twenty miles distant, and carried over the gulley at Cabin John by the vast stone span, and discharging their contents into the receiving reservoir, from which the drinking water for the city is conveyed through other mains



CABIN JOHN BRIDGE. THE LONGEST SPAN STONE ARCH IN THE WORLD.

to the distributing reservoirs. Controlled as it is by the United States Government, no money is spared to keep the Conduit Road in perfect condition, and its surface is smooth and elastic, with drainage so perfect that in an hour after a severe storm no traces of water are visible. With the exception of a single ridge over which the Conduit Road passes, its surface for a distance of over eight miles is perfectly level, having been made so by a system of grading so complete and magnificent as to command the admiration of all. Scientifically considered, the Conduit Road is one of the best examples of perfect macadamizing to be found in the country, and, following the methods of road construction adopted in France and other European countries, piles of crushed stone have been placed at short distances apart in order that repairs may be quickly and easily made.

Another excellent road is that which extends from the old Aqueduct Bridge over the Potomac to Fort Myer and Arlington, which overlook the city from the Virginia heights. This is also a Government road, being in charge of the War Department, and, so far as its surface and its general conditions are concerned, it compares favorably with the Conduit Road,



ROADWAY AND ARTIFICIAL POND IN GROUNDS OF "THE SOLDIERS' HOME."

although it is not more than two and one-half miles in length. But few attempts at grading have been made on this road, since, for its greater length, it extends up a long and tiresome hill to Fort Myer. At Arlington, the Fort Myer Road branches out into numerous carriage-ways, extending in all directions through that beautiful cemetery and kept in a perfect state of repair. Owing to the ordinances in force, only light carriages are allowed on the Arlington Roads, so that they are subject to but little wear, and in this way repairing is reduced to a minimum.

A mile or two to the north of the city is the Soldiers' Home, covering a tract of many acres and constituting a Government refuge to indigent and decrepit Union soldiers. The roads of the Soldiers' Home are delightfully smooth, and it is to these roads principally that the able-bodied soldiers living there give their closest and best attention. They are being worked on constantly, and their surface is always in the most perfect condition possible. The many small hills within the Soldiers' Home not only add greatly to the beauty of that attractive spot, but constitute a means whereby these roads may be perfectly and naturally drained. On all of the suburban roads out of Washington, and principally in Summer evenings, when the air is cool, will be found vehicles of all varieties, from the stylish

drag of society and the quiet and dignified victoria of the cabinet minister, down to the plebeian milk cart and graceful bicycle, representing the cosmopolitan society of a cosmopolitan city.

But to the man who has accomplished all this, to him to whom all credit should be given, Washington has paid but poor tribute, and to-day he is an outcast from all, toiling under the scorching Mexican sun, striving to regain the fortune which was lost in the city he loved so well.



PRESERVING THE CARRIAGE.

THE preservation of a carriage depends largely upon the way in which it is housed. The barn or shed should be airy and dry, with a moderate admission of light. Do not let the vehicle be rolled near a brick wall. The carriage house should not be connected with the stable or next to the manure pit; the ammonia fumes arising from the manure ruin varnish. Do not allow mud to dry on a newly varnished carriage; spots and stains will be the result if you do. Do not permit water to dry of itself on a varnished surface, but remove all the moisture with a chamois leather only, after the soft sponge has been used.

DIRT ROADS AND GRAVEL ROADS.

By Isaac B. Potter.

V.

(Continued.)

Tracing of Plans.—Having gone over the line of your proposed road and examined it in all its phases, and having drawn your plans for all important structures and parts where the methods of construction cannot be amply described in writing, you are next to consider the subject of construction work and to determine how this may be best and most economically done. Before beginning the actual work of construction, however, you must see to it that your plans are in such convenient form as to permit their being readily copied and of such durable nature as to warrant your taking them into the field and placing them, if need be, into the hands of your workmen without danger of their destruction. For this purpose " tracings " are most commonly used by engineers and contractors. Tracings may be made upon a semi-transparent and moderately tough paper especially prepared for this class of work ; but best of all, and still to be had at a reasonable price, is the tracing cloth or tracing muslin to be found at the stores of many stationers and always to be had of dealers in drawing materials. It is prepared by treating a sheet of thin muslin with a coating of an adhesive substance which fills the pores of the cloth and leaves a smooth, clean surface upon its face, at the same time rendering the muslin sufficiently transparent to permit the black lines of any ordinary drawing to be readily seen through the substance of the cloth. It is largely used by engineers and architects, and you are perhaps quite familiar with its appearance. Its chief advantage over the tracing paper lies in its superior toughness and durability, and a folded sheet of tracing cloth may contain drawings which are practically uninjured by long wear and constant use on important work. The plans are transferred to the tracing cloth by simply pinning the muslin closely and smoothly down against the face of the drawing by means of thumb tacks, and then by the use of ordinary drawing

instruments tracing the lines of the original drawing upon the glazed surface of the muslin, through which they may be easily seen.

Earth Work.—This kind of work is likely to comprise the bulk of your labor in the construction of a road, and in some cases millions of cubic yards must be removed from excavation and placed in embankments before the construction work is completed. The extended building of railroads throughout the country and the infinite toil and great cost involved in their construction, have spurred American contractors and railroad builders to the adoption of improved machinery for the handling of earth, both in excavation and embankment. The amount of

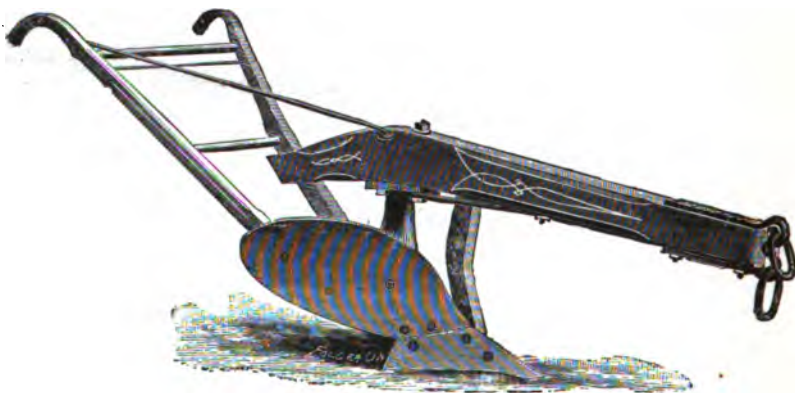


FIG. 17. TOWNSHIP OR BREAKING PLOUGH.

money saved by the adoption of these machines, and the great economy of labor saved in their use, is beyond computation, and no practical writer on the subject of highway construction will hesitate to recommend their use where the work is sufficiently extended to demand attention to the subject of economy.

The first, and one of the most commonly used implements in the country road work, is the plough, and in selecting a plough for this purpose you must bear in mind that it will be subjected to severe work and should be strongly put together and made to stand the work of four horses when necessary.

Special ploughs for heavy work are made by some manufacturers and are called "township" or "breaking" ploughs, "road ploughs" and "grading ploughs," according to the special pattern adopted in manufacture, and the particular class of work for

which the plough is intended. Fig. 17 shows one of these, in which the plough is made of great strength. The beam is made of tough, selected white oak, length 6 feet, and $3 \times 5\frac{1}{2}$ inches at standard. The standard is wrought iron, "V" shaped, secured to beam by two strong bolts that will not twist nor break. The mould board, landside, point and cutter are made of wrought steel, hardened, and a wrought iron clevis with two rings is provided as shown in Fig. 17. This plough is of light draft for two horses, but is frequently used with four in heavy soils. It cuts a furrow of about ten inches wide and six to eleven inches deep. Weight about 120 pounds.

Scrapers.—These are great labor savers in many places, and are made in a variety of forms. The best are of solid steel, being lightest, strongest and most durable, and in the end the



FIG. 18. STEEL DRAG SCRAPER.

cheapest. In many soils a good steel scraper can be used even though ploughing has not been done, but the plough is always an important aid in loosening the soil, no matter what method is adopted for its removal. The common solid steel drag scrapers will carry from three to seven cubic feet of earth, the largest size being generally employed for longer hauls and where the earth is to be carried away on a down grade. A scraper having a capacity for about five cubic feet is best for ordinary carting, while if only one horse is employed, and light work only is intended, the scraper carrying three feet will be sufficient.

In the employment of a scraper you will find it necessary in most cases to use a team of two horses, and if the haul is short the size of the scraper should be made correspondingly smaller, because the filling of the scraper will be more frequent, and this portion of the work will be very severe upon your team.

Scrapers are largely used in the handling of earth where much work is to be done, and they have an advantage in cheapening the cost of the work. Trautwine computes that by the use of a drag scraper in light soils, the cost of handling earth per cubic yard (not including contractor's profit) varies from five and a half to twelve cents per cubic yard where the lengths of haul vary from 200 to 250 feet, including the spreading of the material in places, while the same cost under shorter lengths of haul, where the earth is "wasted," varies from four and a half to eleven cents.



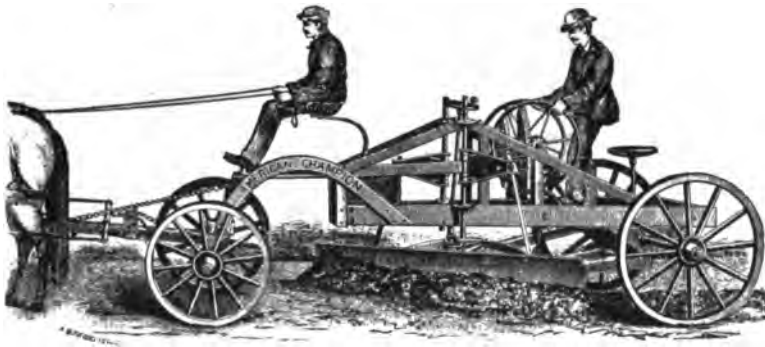
FIG. 19. WHEELED SCRAPER.

The same author, referring to the use of the drag scraper in heavy soils, fixes the cost for picked and spread materials at eleven cents per cubic yard where the haul is fifty feet, to seventeen cents where the haul is 200 feet, and these figures will be reduced by about three cents per cubic yard where the material is ploughed instead of picked. Where the earth is wasted instead of being spread, a further reduction of from one to one and one-half cents per cubic yard may be counted upon.

Wheeled scrapers may also be sometimes used to advantage. They are made to carry from about twelve to seventeen cubic feet of earth when "even full," and mounted on wheels having broad tires to prevent them from cutting into the soft earth. The bowl of the scraper is made so that it may be raised or lowered, and is operated by lowering the edge of the scraper into the earth until the bowl is filled, after which it is raised a distance of some inches above the ground and carried to the dump or embankment when the bowl is emptied by revolving it upon an axis from which it is hung. The cost of removing

earth by wheel scrapers is somewhat less than that involved in the use of the drag scraper, but unless your work is quite extended the latter will answer your purpose. A wheel scraper of medium size will weigh about 450 pounds, will carry a little less than one-half a cubic yard, and will cost from \$50 to \$70. A drag scraper weighing about 100 pounds will cost from \$12 to \$15.

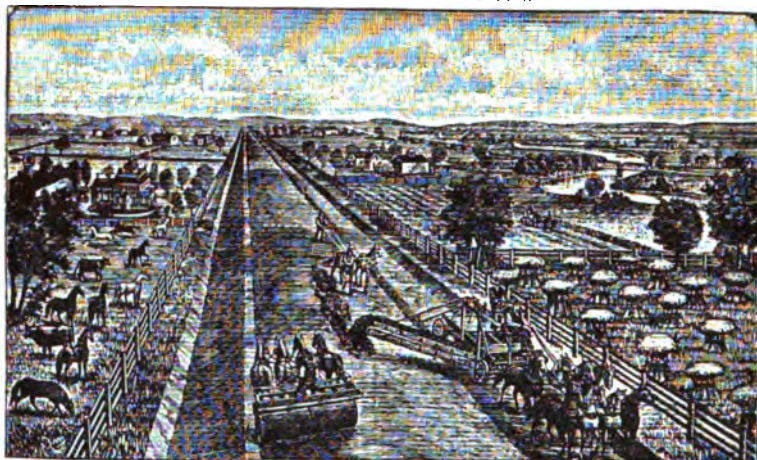
Improved earth moving machinery, called by various titles, such as "road machines," "road hones," "graders," etc., have rapidly come into popular use within the last few years, and are deservedly attracting the attention of town road makers all



"AMERICAN CHAMPION" ROAD MACHINE AT WORK.*

over the country. No town having in its keeping the usual length of dirt roads can afford to be without a road machine, for it not only does better work than is commonly accomplished by the amateur road maker who works out his road tax, but a good road machine, under favorable conditions, will do the work of forty men. About twenty-five years ago Wilkinson's "Improved Rut Scraper and Grading Machine" was first made known, and the language of the inventor describes it as having a changeable angle of grader and pole for the purpose of causing grader to cut hard surfaces with greater efficiency and to "cause it to deposit surplus soil in front of it at either end." There is little doubt that the modern road machines are vastly improved over the Wilkinson pattern, but the same general principle prevails in all. A steel or steel-shod blade is so arranged and adjusted by attachments to the frame from which it is suspended, that it can be in most cases easily reversed or adjusted for right or left action by the operator. The manufacturers will generally be

*Made by the American Road Machine Company, Kennett Square, Pa.



AUSTIN'S "NEW ERA" ROAD GRADER AT WORK.

found willing to supply a machine on trial or at least to send an agent who will instruct the purchaser in the use of the machine, and provide all necessary printed directions for their operation and repair. For grading new work, and for the repair and keeping of old roads, they may be used to advantage in most cases, and I do not hesitate to recommend them for your use.

Besides the improved road machines made for rapid and economical repair and improvement of country roads, the F. C. Austin Manufacturing Co., of Chicago, has lately introduced a special grading machine styled the "New Era," which seems to be well adapted to the handling of large quantities of earth and to the construction of new roads where much earth work is involved. This machine I should deem to be of special value in the construction of new roads in level countries where soft soils are encountered, and in such locations it is beyond question a great saver of time and money. The manufacturers claim for this machine that it will load earth on wagons at the cost of about two cents per cubic yard, and that their special dump wagons will deliver this earth on short hauls at two cents per yard, additional. The illustration which I have shown you on this page, representing the "New Era" grader at work, is perhaps somewhat fanciful; but it represents the method of working the grader in a level country, and a form of earth road which has much to recommend it.

(To be continued.)

A FAMOUS GHOST STORY.*



FRIEND of mine, who was a man of letters and a philosopher, said to me one day, as if between jest and earnest: "Fancy! since last we met, I have discovered a haunted house in the midst of London."

"Really haunted?—and by what? ghosts?"

"Well, I can't answer that question; all I know is this—six weeks ago my wife and I were in search of a furnished apartment. Passing a quiet street, we saw on the window of one of the houses a bill, 'Apartments Furnished.' The situation suited us; we entered the house—liked the rooms—engaged them by the week—and left them the third day. No power on earth could have reconciled my wife to stay longer and I don't wonder at it."

"What did you see?"

"Excuse me—I have no desire to be ridiculed as a superstitious dreamer—nor, on the other hand, could I ask you to accept on my affirmation what you would hold to be incredible without the evidence of your own senses. Let me only say this, it is not so much what we saw or heard (in which you might fairly suppose that we were the dupes of our own excited fancy, or the victims of imposture in others) that drove us away, as it was an indefinable terror which seized both of us whenever we passed by the door of a certain unfurnished room, in which we neither saw nor heard anything. And the strangest marvel of all was, that for once in my life I agreed with my wife, silly woman though she be—and allowed, after the third night, that it was impossible to stay a fourth in that house. Accordingly, on the fourth morning, I summoned the woman who kept the house and attended on us, and told her that the rooms did not quite suit us, and we could not stay out our week. She said, dryly, 'I know why; you have stayed longer than any other lodger. Few ever stayed a second night; none before you a third. But I take it they have been very kind to you.'

*"The House and the Brain." By Edward George Bulwer: Lord Lytton.

“ ‘They—who?’ I asked, affecting a smile.

“ ‘Why, they who haunt the house, whoever they are. I don’t mind them; I remember them many years ago, when I lived in this house, not as a servant; but I know they will be the death of me some day. I don’t care—I’m old, and must die soon anyhow; and then I shall be with them, and in this house still.’ The woman spoke with so dreary a sadness, that really it was a sort of awe that prevented my conversing with her further. I paid for my week, and too happy were I and my wife to get off so cheaply.”

“You excite my curiosity,” said I; “nothing I should like better than to sleep in a haunted house. Pray give me the address of the one which you left so ignominiously.”

My friend gave me the address; and when we parted, I walked straight toward the house thus indicated.

It is situated on the north side of Oxford Street, in a dull but respectable thoroughfare. I found the house shut up—



no bill at the window, and no response to my knock. As I was turning away, a beer boy, collecting pewter pots at the neighboring areas, said to me: “Do you want any one at that house, sir?”

“Yes, I heard it was to be let.”

“Let! why, the woman who kept it is dead—has been dead these three

“ ‘DO YOU WANT ANY ONE AT THAT HOUSE, SIR?’ ”

weeks, and no one can be found to stay there, though Mr. J—— offered ever so much. He offered mother, who chars for him, £1 a week just to open and shut the windows, and she would not.”

“Would not!—and why?”

“The house is haunted; and the old woman who kept it was

found dead in her bed, with her eyes wide open. They say the devil strangled her."

"Pooh!—Mr. J——. Is he the owner of the house?"

"Yes."

"Where does he live?"

"In G—— Street, No. ——."

"What is he?—in any business?"

"No, sir—nothing particular; a single gentleman."

I gave the pot-boy the gratuity earned by his liberal information, and proceeded to Mr. J——, in G—— Street, which was close by the street that boasted the haunted house. I was lucky enough to find Mr. J—— at home—an elderly man, with intelligent countenance and prepossessing manners.

I communicated my name and my business frankly. I said I heard the house was considered to be haunted—that I had a strong desire to examine a house with so equivocal a reputation—that I should be greatly obliged if he would allow me to hire it, though only for a night. I was willing to pay for that privilege whatever he might be inclined to ask. "Sir," said Mr. J——, with great courtesy, "the house is at your service, for as short or as long a time as you please. Rent is out of the question—the obligation will be on my side should you be able to discover the cause of the strange phenomena which at present deprive it of all value. I cannot let it, for I cannot even get a servant to keep it in order or answer the door. Unluckily the house is haunted, if I may use that expression, not only by night, but by day, though at night the disturbances are of a more unpleasant and sometimes of a more alarming character. The poor old woman who died in it three weeks ago was a pauper whom I took out of a work-house, for in her childhood she had been known to some of my family, and had once been in such good circumstances that she had rented that house of my uncle. She was a woman of superior education and strong mind, and was the only person I could ever induce to remain in the house. Indeed, since her death, which was sudden, and the coroner's inquest, which gave it a notoriety in the neighborhood, I have so despaired of finding any person to take charge of the house, much more a tenant, that I would willingly let it rent-free for a year to any one who would pay its rates and taxes."

"How long is it since the house acquired this character?"

"That I can scarcely tell you, but very many years since. The old woman I spoke of said it was haunted when she rented it between thirty and forty years ago. The fact is, that my life has been spent in the East Indies, and in the civil service of the Company. I returned to England last year, on inheriting the fortune of an uncle, among whose possessions was the house in question. I found it shut up, and uninhabited. I was told that it was haunted, that no one would inhabit it. I smiled at what seemed to me so idle a story. I spent some money in repairing it—added to its old-fashioned furniture a few modern articles—advertised it, and obtained a lodger for a year. He

was a colonel retired on half-pay. He came in with his family, a son and a daughter, and four or five servants; they all left the house the next day; and although each of them declared that he had seen something different from that which had scared the others, a something still wasequally terrible to all. I really could not in conscience sue, nor even blame, the colonel for breach of agreement.



"TAKE WITH YOU MY REVOLVER AND MY DAGGER."

Then I put in the old woman I have spoken of, and she was empowered to let the house in apartments. I never had one lodger who stayed more than three days. I do not tell you their stories—to no two lodgers have there been exactly the same phenomena repeated. It is better that you should judge for yourself, than enter the house with an imagination influenced by previous narratives; only be prepared to see and to hear something or other, and take whatever precautions you yourself please."

"Had you never a curiosity to pass a night in that house?"

"Yes. I passed not a night, but three hours in broad daylight in that house. My curiosity is not satisfied, but it is quenched. I have no desire to renew the experiment. You cannot complain, you see, sir, that I am not sufficiently candid; and unless your interest be exceedingly eager, and your nerves

unusually strong, I honestly add, that I advise you *not* to pass a night in that house."

"My interest *is* exceedingly keen," said I, "and though only a coward will boast of his nerves in situations wholly unfamiliar to him, yet my nerves have been seasoned in such variety of danger that I have the right to rely on them—even in a haunted house."

Mr. J—— said very little more ; he took the keys of the house out of his bureau, gave them to me, and thanking him cordially for his frankness, and his urbane concession to my wish, I carried off my prize.

Impatient for the experiment, as soon as I reached home, I summoned my confidential servant—a young man of gay spirits, fearless temper, and as free from superstitious prejudice as any one I could think of.

"F——," said I, "you remember in Germany how disappointed we were at not finding a ghost in that old castle, which was said to be haunted by a headless apparition? Well, I have heard of a house in London which, I have reason to hope, is decidedly haunted. I mean to sleep there to-night. From what I hear, there is no doubt that something will allow itself to be seen or to be heard—something, perhaps, excessively horrible. Do you think, if I take you with me, I may rely on your presence of mind, whatever may happen?"

"Oh, sir! trust me," answered F——, grinning with delight.

"Very well, then ; here are the keys of the house—this is the address. Go now—select for me any bedroom you please ; and since the house has not been inhabited for weeks, make up a good fire—air the bed well—see, of course, that there are candles as well as fuel. Take with you my revolver and my dagger—so much for my weapons—arm yourself equally well! and if we are not a match for a dozen ghosts, we shall be but a sorry couple of Englishmen."

I was engaged for the rest of the day on business so urgent that I had not leisure to think much on the nocturnal adventure to which I had plighted my honor. I dined alone, and very late, and while dining, read, as is my habit. I selected one of the volumes of Macaulay's Essays. I thought to myself that I would take the book with me ; there was so much of healthfulness in the style, and practical life in the subjects, that

it would serve as an antidote against the influences of superstitious fancy.

Accordingly, about half-past nine, I put the book into my pocket, and strolled leisurely toward the haunted house. I took with me a favorite dog—an exceedingly sharp, bold and vigilant bull-terrier—a dog fond of prowling about strange ghostly corners and passages at night in search of rats—a dog of dogs for a ghost.

It was a Summer night, but chilly, the sky somewhat gloomy and overcast. Still there was a moon—faint and sickly, but still a moon—and if the clouds permitted, after midnight it would be brighter.

I reached the house, knocked, and my servant opened with a cheerful smile.

"All right, sir, and very comfortable."

"Oh!" said I, rather disappointed; "have you not seen or heard anything remarkable?"

"Well, sir, I must own I have heard something queer."

"What?—what?"

"The sound of feet pattering behind me; and once or twice small whispers close at my ear—nothing more."

"You are not at all frightened?"

"I! not a bit of it, sir;" and the man's bold look reassured me on one point—viz., that, happen what might, he would not desert me.

We were in the hall,

the street door closed, and my attention was now drawn to my dog. He had at first run in eagerly enough, but had sneaked back to the door, and was scratching and whining to get out. After patting him on the head, and encouraging him gently, the dog seemed to reconcile himself to the situation, and fol-



"I STOPPED, CAUGHT HOLD OF MY SERVANT AND POINTED TO IT."

lowed me and F—— through the house, but keeping close at my heels instead of hurrying inquisitively in advance, which was his usual and normal habit in all strange places. We first visited the subterranean apartments, the kitchen and other offices, and especially the cellars, in which last there was two or three bottles of wine still left in a bin, covered with cobwebs, and, evidently, by their appearance, undisturbed for many years. It was clear that the ghosts were not winebibbers. For the rest we discovered nothing of interest. There was a gloomy little back yard, with very high walls. The stones of this yard were



"A CHAIR OPPOSITE TO ME MOVED FROM THE WALL."

very damp; and what with the damp, and what with the dust and smoke-grime on the pavement, our feet left a slight impression where we passed. And now appeared the first strange phenomenon witnessed by myself in this strange abode. I saw, just before me, the print of a foot suddenly form itself, as it were. I stopped, caught hold of my servant, and pointed to it. In advance of the footprint as suddenly dropped another. We both saw it. I advanced quickly to the place, the footprint kept advancing before me, a small footprint—the foot of a child; the impression was too faint thoroughly to distinguish the shape,

but it seemed to us both that it was the print of a naked foot. This phenomenon ceased when we arrived at the opposite wall, nor did it repeat itself on returning. We remounted the stairs, and entered the rooms on the ground floor, a dining parlor, a small back parlor, and a still smaller third room that had been probably appropriated to a footman—all still as death. We then visited the drawing-rooms, which seemed fresh and new. In the front room I seated myself in the arm-chair. F— placed on the table the candlestick with which he had lighted us. I told him to shut the door. As he turned to do so, a chair opposite to me moved from the wall quickly and noiselessly, and dropped itself about a yard from my own chair, immediately fronting it.

"Why, this is better than the turning-tables," said I, with a half-laugh; and as I laughed, my dog put back his head and howled.

F—, coming back, had not observed the movement of the chair. He employed himself now in stilling the dog. I continued to gaze on the chair, and fancied I saw on it a pale, blue, misty outline of a human figure, but an outline so indistinct that I could only distrust my own vision. The dog now was quiet. "Put back that chair opposite to me," said I to F—; "put it back to the wall."

F— obeyed. "Was that you, sir?" said he, turning abruptly.

"I!—what?"

"Why, something struck me. I felt it sharply on the shoulder—just here."

"No," said I. "But we have jugglers present, and though we may not discover their tricks, we shall catch *them* before they frighten *us*."

(*To be continued.*)

We want names and Post-Office addresses (plainly written) of every civil engineer, supervisor, selectman, road commissioner, chosen freeholder, contractor, city engineer, surveyor and legislator in the United States. Kindly send all the names you can to GOOD ROADS, Potter Building, New York.



THE EDITORS TABLE

We want names and Post Office addresses (plainly written) of every civil engineer, supervisor, selectman, road commissioner, chosen freeholder, contractor city engineer, surveyor and legislator in the United States. Kindly send all the names you can to GOOD ROADS, Potter Building, New York.

LEAGUE membership renewals are pouring into the secretary's office to the tune of about seven hundred a week—a rate without precedent in the history of the organization. Time was when the League of American Wheelmen was looked upon from supercilious heights as a company of youngsters organized for the mutual enjoyment of a sport that was too undignified for serious people, and nearly akin to the walking of a tight rope. But, step by step, the League has forced its way to the front and earned the dignified recognition and approval of the public, and the bicycle has taken its place as a vehicle worthy of the name, and proven itself a practical as well as enjoyable means of conveyance. It is used by men and women in all stations of life, and for convenience, cheapness and speed surpasses any other means of human travel within the range of individual ownership. But, best of all, the popularity of the League is largely due to its commanding leadership in the movement for improved roads; and the fact that its growing influence in this respect is concurrent with its rapid increase of membership is of gratifying significance.

THERE could be no better index of the progress of the work for better roads and streets than the unusual number of contracts let and appropriations made for improvements of this kind in different parts of the country. Several of our Eastern cities are preparing to lay many miles of new asphalt pavements, and Western towns are taking kindly to the fire-brick pavements in several localities. Town and county meetings are being held by the score in different parts of

the country, appropriations have been voted for road machinery and for macadam roadways, the question of drainage is receiving marked attention, and civil engineers are turning their attention to the special branches of technical knowledge which the improvement of public roads and streets is now demanding. Manufacturers of drain-pipe and road materials will soon realize a substantial increase of the already enlivened demand for their products, and, unless all signs fail, the tide of prosperity will soon flow in their direction. With a full treasury and largely decreasing indebtedness—federal, state, county, town and municipal—there is no reason why this era of prosperity should not be marked by the internal improvement of the country, and in no department of public industry is the same opportunity offered for this kind of improvement as in the amendment of our road laws and the construction of better roads.

THE "daily press" reports 6,000 pavers on strike. Judging from the condition of some of the important streets in one or two big cities with which we are tolerably familiar, it is hard to believe that so great a number of pavers ever existed. But while this subject is made prominent by reports of disturbance in the labor department, it would not be inappropriate, and certainly not harmful, for the citizens who have so long endured this sort of streets to get up a little strike on their own account.

TELEGRAMS from Iowa announce the absolute stoppage of traffic and the isolation of whole towns as the results of heavy rains and impassable roads. Provisions and fuel can be had with only the greatest difficulty, and millions of dollars are lost by the wading and floundering people of these country towns, not only in the payment of famine prices, but in the delays and expenses of trying to carry on business over highways which have never been made with the view

of serving as permanent means of communication. And yet some of these people are apt to say that a man who urges the payment of one-quarter this wasted sum in the construction of permanent and water-proof roads, is a "crank."

EACH year, within the United States, there are convicted for various offences against the public peace about 600,000 male prisoners of mature age. These criminals are commonly confined in the State prisons and common jails, and during the term of their punishment are largely sustained and clothed at the public expense. This expense alone entails an enormous tax, of which property in all localities must share the burden, and a most serious question has for many years been discussed touching the manner in which these convicts can be employed without competing with the skilled labor of our free citizens. No solution has yet been reached which seems to meet the case. Labor organizations have repeatedly demanded that these convicts be made to earn their own sustenance by the performance of public work, and notably that of constructing and maintaining the public roads. Such labor has been utilized in other countries to the great advantage of the public, and it offers such an apparent double advantage in the reduction of the public tax and the solution of the convict labor question that it is well worthy of a thorough trial. But besides the regularly convicted criminals, there is an immense vagrant population, comprised mostly of able-bodied men, drifting about from one part of the country to another and commonly called "tramps." They have largely increased in numbers during the last few years, and have become one of the social problems of the day. It is not unlikely that if all the tramps in a given town were compelled by law to do a little work now and then upon the public roads, and thus pay tribute to the public that clothes and feeds them, the growth of this species of lazy vagrancy would be considerably checked.

EVERYWHERE, east and west, the newspapers are taking up the matter of the road machine exhibit at the coming Columbian Exposition, and urging the scheme pro-

posed by Colonel Pope of a rearrangement, by which the exhibit may be of permanent value and serve as an object lesson to the hundreds of thousands of Americans who are already interested in the subject of improved roads. The interest has indeed become so wide and so prominent that it is clearly paramount to other industrial questions to which the public hand is now directed, and no greater good can be accomplished by the Columbian Exposition than might be attained by the carrying out of Colonel Pope's practical idea. It is to be hoped that the managers will not be too short sighted and tenacious to recognize this wide demand. The Exposition is after all an American institution, and it should be carried on with a respectful consideration of the wishes of the American people.

THE Radford (Va.) Wheelmen have adopted an unique and forceful means of pushing the good roads movement by the use of their club "letter heads." Upon these are printed in half tone plate work pictures showing the contrast between good and bad roads, and under the illustrations are brief but suggestive sentences appropriate to the pictures. We extend our congratulations to the Radford Wheelmen for originating an excellent and useful idea, and commend their example to the emulation of other clubs throughout the country. Good roads can only be attained by the pushing of an organized social force in their favor, and in most cycling communities there is to be found no more active, energetic and intelligent class of young men than those who make up the wheeling organizations

GOVERNOR FLOWER of New York has vetoed the New Utrecht Road Bill—the best highway road improvement bill that has passed the New York Legislature in fifty years. The Governor says it is "unconstitutional." Competent lawyers do not quite agree with him. The Governor is not himself a lawyer, but when crossed in his opinions he may always find refuge in that elegant, gentlemanly and dignified expression which was comprised in the single word with which he recently replied to a committee of gentlemen from the New York Chamber of Commerce—"Rats."



NEWS AND COMMENT

We want names and Post Office addresses (plainly written) of every civil engineer, supervisor, selectman, road commissioner, chosen freeholder, contractor, city engineer, surveyor and legislator in the United States. Kindly send all the names you can to GOOD ROADS, Potter Building, New York.

PROFESSOR HAUPT says that a good average road, through a rolling country, should never cost over \$7,000 per mile, and frequently not over \$2,000. And the expenditure pays. To pull one ton on macadam costs just one-half as much as on hard dirt, and one-fourth as much as on sand. It is estimated that in England improved roads have made it possible for three horses to do the work formerly done by four, thus saving \$100,000,000 annually. It is also stated that with improved roads the farm produce of Illinois could be hauled for \$15,000,000 per annum less than now, and that \$160,000,000 would be added to the value of the farm.

RUDYARD KIPLING, in a letter published in the London *Times*, criticises New York City bitterly. He refers to it as "a long, narrow pig trough," and says it is bad in the paving of its streets, bad in its police management and bad in its sanitary arrangement. His opinion is that in New York there is but light regard for human life; that justice is bought and sold and good roads unknown.

THE people of Westchester, Pa., have raised, as a free contribution for the improvement of the public roads, the sum of \$750 per mile for a distance of nine miles, and the contributions are still coming. Mr. Frank P. Darlington reports that the sum will probably reach \$1,000 per mile, and with good material at hand this will be enough to insure substantial improvement. The road first to be improved connects at Paoli with an excellent highway running to Philadelphia.

THE following telegram, sent by the Associated Press on May 1 from Fort Dodge, Ia., shows how they dance round the May pole out in that country:

FORT DODGE, IA., May 1.—Not a pound of coal can be bought, borrowed, begged or stolen in the town of Pocahontas. A coal famine that has been in progress there for several weeks has reached its culmination in the absolute exhaustion of the supply. Cordwood, too, is a scarce article, and fencing, sidewalks and sheds all over town are suffering. 'The cause of the famine is to be found in the isolated condition of the town and the unprecedented bad roads the past month. Pocahontas Center is the only county seat in Iowa without a railway. No railway stations are within fifteen miles of the town, and coal mines are equally remote. All the fuel has to be hauled from Rolfe or Gilmore City. Since April 1 rains have been so frequent that the roads have been in such a condition that it has been impossible to haul any freight. During the early days of the famine the dealers' supply of coal was soon exhausted, and those whose supply was short borrowed of their more lucky neighbors. The natural result was that the entire supply in the town was eventually exhausted and a campaign for wood began. The wood has finally played out, and now anything that will burn is used for fuel. The roads are bad and still impassable, and the famine bids fair to continue. Food supplies, too, are running short, and much inconvenience has been caused.

A LETTER from Secretary Levi Chubbuck, Secretary of the Missouri State Board of Agriculture, gives great encouragement to the workers for road improvement in that State. The Monthly Bulletin issued by the State Board contains special reference to the road improvement subject, and of this bulletin about 66,000 copies of each issue are circulated.

QUERIES AND ANSWERS

"M. A."—We cannot attempt to settle any differences of opinion regarding the relative merits of light and heavy rollers, but for most purposes we do not hesitate to recommend the heavy roller as being, in our judgment, infinitely the better of the two. The tendency to increase the weight of horse rollers is evidence that the value of heavy rollers is becoming generally understood. For compressing and hardening the graded surface before putting on broken stone or laying Telford bottom, no roller can be too heavy, nor can this portion of the work be done too thoroughly. The use of a heavy roller on the earth surface will develop holes and undulations on the surface of what appeared to be a uniform and excellent grade; thus bringing to light soft spots which should be filled with suitable material and rolled till the surface is hard and smooth. A light roller will not always accomplish this result.

"L. M. T."—The use of fire brick or "vitrified" brick for street pavements is not quite an experiment, this brick having been used for many years in European cities for this purpose. Its cheapness depends somewhat upon the manner in which it is laid. Some cities require two layers of brick, one above the other, and in some cases a concrete bottom is required. The pavement seems to give excellent satisfaction in some of our American cities, and its use is increasing.

"ECKSTEIN."—The bicycles advertised in our pages are made by responsible and reputable concerns, and may all be relied upon. The question, "which wheel is the best," must be decided by the individual fancy of the rider. Like the gun we shoot, the pen we write with and the cigars we smoke, we are apt to believe that the bicycle we ride is *the* bicycle. Go to a responsible dealer who handles standard makes and tell him you want a bicycle that is advertised in GOOD ROADS. He will fit you out to your satisfaction.

"W. J. E."—Under the conditions you name you will be unable to issue corporation bonds without a special act of the Legislature. Lay the matter before your corporation attorney and get his opinion. If necessary he will draft a bill that will grant the necessary powers to your town officers, and unless opposed by parties immediately interested, you will have no difficulty in getting it through the Legislature. It would be well to stir up a sentiment in favor of the proposition, and get its endorsement by public meeting before introducing your bill.

"SIMPLEX."—A brick arch of twenty feet span and four and a half feet rise can be made durable and substantial. It would be better to have stone abutments. Specify hard burnt brick; reject bats. Insist upon strong cement mortar, and oversee your work carefully. Any intelligent mason will give you good practical information on these points.

"G. G."—We cannot undertake to push the sale of any man's goods by the use of the reading columns of GOOD ROADS. We aim to put our advertisers on an equal footing, and when disposed to recommend an article which we know to be excellent, we do so voluntarily and without compensation.

"P. METZGER."—We should advise you to go ahead with your meeting, notwithstanding the opposition. Equip yourself with facts and arguments sufficient to "down" any ignorant objector and you will find the thinking men of your neighborhood to be gradually coming to your aid. Of course, there will always be some objection to any scheme of whatever merit, but there is a saying that "One man in the right will get to be a majority." Call your meeting in the regular way; open it with a ringing speech by the man who is best capable of making it; state your proposition and urge its importance to the town, and then offer a booby prize for the man who makes the longest speech against it.

POPULAR OPINION

We want names and Post Office addresses (plainly written) of every civil engineer, supervisor, selectman, road commissioner, chosen freeholder, contractor, city engineer, surveyor and legislator in the United States. Kindly send all the names you can to GOOD ROADS, Potter Building, New York.

"WE take pleasure in informing you that Westfield is to have about one mile of new paved road, and credit is due to 'Gospel of Good Roads,' as about twenty-five or thirty copies of the same were judiciously distributed among the hotels, clubs, barber shops and reading rooms, and at town meeting a good number more were placed in the hands of men whom we believed to be interested in the subject of 'Good Roads.' The resolution was passed at said town meeting to pave Elm Street from Depot to Post Office, and work is to be commenced at once. For many years the street named has been a disgrace to our town. It is the principal thoroughfare and is much traveled over. A large amount of money has been expended each year for several years past, trying to keep said street in good condition, but we regret to say it seems like money thrown away. Now we are to have something substantial, and trust that this is but the beginning. Wishing you success in your endeavors, we remain, yours truly"—*American Whip Company, Westfield, Mass.*

"PLEASE send me the 'Gospel of Good Roads,' and any other matter of interest on this subject. I consider this question of good roads of more importance to us farmers than any of the national issues now being discussed. Yes, I am a crank on the good road question, and so will all farmers be, as soon as they are made to understand the need and importance. I favor Government management of all roads."—*S. S. Aiken, Prospect, Ore.*

"I LIVE in the suburbs of Pittsburgh and have a mile and a half stretch of country road to go over on my wheel as I ride to town. Though the community is wealthy, in wet weather the roads are execrable. I never saw such high and deep furrows and ridges as I now see. Then, in spots the wise supervisor has clinkered it, and the big ones get on top. No dodging them; for every one you miss you strike three."—*James G. Hayes, Pittsburgh, Pa.*

"THANKS to the wheelmen of this country, a new era for the care of the quality of country roads is dawning. An earnest of this increased interest is seen in the publication in New York of an illustrated monthly magazine, GOOD ROADS. I wish a thousand copies of GOOD ROADS could be taken in this county and the enthusiasm awakened to the county for a million dollars to build 100 miles or more of Telford roads."—*C. M. Plumb, Oakland, Cal.*

"WE want your magazine GOOD ROADS in the reading room of our library. Please put us down as a subscriber and send us all the back numbers for this year. We want, also, a complete set of the magazines for 1891. If you have them unbound, we would prefer them that way. Otherwise, please send us the bound volume for 1891. Col. Albert A. Pope has kindly furnished us a list of books on the subject of road improvement, and in the list are these two items: 'A Bill Relating to the Construction, Maintenance and Repair of the Highways and Roads in the State of New York Introduced into the New York Legislature, January 14, 1890.' 'The New York Highway Improvement Bill.—Potter.' Can you send us these, or tell us where we can get them? Please send bill for subscription, back numbers, etc., and we will send check."—*E. H. Andrews, Librarian, Carnegie Library, Braddock, Pa.*

"PLEASE accept my thanks for a copy of your valuable monthly. I am well pleased with its general 'get up' and with its purpose."—*J. W. Burt, Hartford, Conn.*

"A NEW club formed here—the Radford Wheelmen—and we are going to do what we can. Please find my check for \$2 enclosed, for one year's subscription, to be sent to Doran Library, Radford, Va. Send me receipt and make bill to Radford Wheelmen. I am secretary. We received notice to-day that the Legislature had granted us a charter."—*Melmoth M. Osborn, Radford, Va.*

"ALLOW me to express gratification at the good beginning you have made with GOOD ROADS. I am in fullest sympathy with your laudable undertaking to civilize our country roads, not only because I have 'been stuck' more than once, losing time, money and patience, but because the 'road question' is very largely at the bottom of the 'forestry question' for which I have battled for a decade with but partial success. * * * May your work of reform progress with such speed and get upon such smooth and permanent road as its simple common sense principle should command."—*B. E. Fernow, Chief of Forestry Division, U. S. Department of Agriculture, Washington, D. C.*

"I PROPOSE starting one or two young men with a letter to some of my business friends in the city, urging them to subscribe for GOOD ROADS, and shall work particularly hard among the members of the city government. I have been intending to call on you and talk this matter over, but being exceedingly busy I have not been able to accomplish it yet. If you have any suggestions to make in regard to getting subscribers, I shall be glad to hear from you."—*George H. Day, Vice-President, Pope Manufacturing Co., Hartford, Conn.*

"THE good work of agitation, by lectures at farmers' institutes, conventions, field trials of road machinery, in our monthly bulletins and annual reports, in the press, and by all possible means, will be continued until Missouri shall have a system of public roads as nearly perfect as science and money can make. As a valuable aid to the cause we commend to all interested in the subject the periodical called GOOD ROADS. It is a handsomely printed and illustrated monthly magazine of fifty pages, published by the League of American Wheelmen, and edited by I. B. Potter, Potter Building, New York."—*Monthly Bulletin, Missouri State Board of Agriculture.*

"I RECEIVED the March number of your magazine, and noticing the request for everybody interested in good roads to send in names and addresses of citizens in general, I herewith enclose a few, who reside on the only miserably mean road that leads into our little city. If you wish the names of others who live in the interior of the county, I can send them to you. We have fourteen good turnpikes coming into town, hence know what good roads are. Count on me for any aid I can render you."—*J. W. Sparks, Jr., Murfreesboro, Tenn.*

"IT is a pleasure to read GOOD ROADS, and more good can be done in this than in any other manner."—*J. S. Holmes, President, Associate Cycling Club, of New Jersey.*

"FROM America comes a copy of the third number of the magazine called GOOD ROADS. It is a very serious publication, far more so than anything else of the kind published anywhere, and is excellently edited. Its editor is Mr. Potter, whose name is so identified with the roads improvement movement in America, and who wrote the article in the *Century* to which we referred a week or two ago. One very good point he makes when he says that bad highways are owing less to lack of funds than to their waste, together with the absence of intelligently devised plans. That there should be a demand for such a periodical shows what a force and power in the land cyclists have become."—*London Illustrated Penny Paper.*

"I WOULD like to find some way by which monthly issues of GOOD ROADS might be placed in the hands of every supervisor or commissioner of highways in this country during the current year. Kindly inform me, at your convenience, what terms you could make for forty copies of the magazine, to be mailed monthly to each of the proper officials in the forty wards and towns in this county. If you can suggest any better plan for bringing this subject more directly to the attention of the officials having the care of the roads in the county, I will be glad to have you do so."—*Wendell M. Smith, Rochester, N. Y.*

"IN response to your request, I send names of officers with the hope that your splendid publication may enlist their interest and work for good streets and roadways. * * * I am interested in your work of 'evangelizing' the country, and will do you and the cause a service whenever an opportunity comes this way."—*W. M. Lathrop, Carbonville, Pa.*

"TWO copies of your publication have reached me: the numbers for January and February. I have read both with interest, and shall publish a complimentary notice in the next issue of the *News*; and as the needs of this State require it from a slovenly way of working, shall use your article, 'The Gospel of Good Roads,' to run through a series of issues until it is all published, thus putting the subject before our reader, and will send you copies of the papers. We have plenty of material right on hand to make good roads, but from failure of construction they are bad. I would keep a horse to drive but for the bad roads."—*Thomas H. Hill, Sequatchee News, Sequatchee, Tenn.*

"PLEASE accept my thanks for the copies of GOOD ROADS which you have mailed me. I send you by this mail a copy of our paper containing your advertisement, and also proof of a little editorial on it, which is in our issue of the 30th, now in press."—*B. W. Lair, Dayton, Ohio.*

"IN behalf of the Lexington Wheel Club I would state that we are truly in sympathy with you in your good work, and wish you abundant success. As soon as the Club survives the expense incurred in the meet at this place, it will be with great pleasure that we contribute to GOOD ROADS' aid, as our ability will permit and its necessity require. And further, the newspaper on which I am engaged has frequently published commendable articles of GOOD ROADS' work and shall continue to do so. Kentucky wheelmen shall ever labor to further the interests of your valuable publication."—*Luke P. Pettus, Lexington, Ky.*

"THE latest magazine to make its appearance is called GOOD ROADS. Its object is, of course, implied in the title, and it is a very worthy object and a very large question for the people of the United States to face."—*Los Angeles (Cal.) Times.*

"CURIOUSLY enough, the general awakening to the importance of good country roads has been brought about by the spread of a branch of athletics. If the use of the bicycle had not been adopted so generally in the past few years, it is doubtful if we should have heard much of the subject of road improvement for many years to come. As it is, the thousands of bicycle riders, for the most part aggressive and energetic young men and women, have learned by practical experience how bad the country roads of the United States really are. They have in turn appealed to those who have the greatest interest in the subject of road improvement, the farmers of the country, and the appeal has not been made in vain."—*Boston Daily Advertiser.*

"I CONGRATULATE you on the success GOOD ROADS is making."—*H. G. Rouse, President, Rouse, Hazard & Co., Peoria, Ill.*

"STORMS, bad weather and bad roads have much retarded trade during the past week, reducing the movement of grain and curtailing the retail trade in many cities."—*Weekly Trade Report of R. G. Dun & Co.*

CONTRACT NOTES

We want names and Post Office addresses (plainly written) of every civil engineer, supervisor, selectman, road commissioner, chosen freeholder, contractor, city engineer, surveyor and legislator in the United States. Kindly send all the names you can to GOOD ROADS, Potter Building, New York.

ROADS AND STREETS.

VIRGINIA.—King Street, Alexandria, is to be paved with Belgian blocks.

There is a movement on foot at Roanoke to pave the principal streets with vitrified brick.

TENNESSEE.—Estimates have been prepared by the City Engineer of Memphis for paving the streets.

Most of the important streets of Chattanooga will be paved during the Summer. The city has on hand \$107,983 for this work.

The Tennessee and Miller Paving Companies are to pave Court Square at Memphis.

At Nashville, Summer Street is to be paved by J. B. Diver, with granite, at a cost of \$2.25 per square yard.

King Street, from Market to Kent, is to be paved with Belgian blocks at Chattanooga.

NEW YORK.—\$30,000 for macadamizing streets has been voted by the city of Ridgewood.

At New York bids are asked by the Department of Public Parks for 9,000 cubic yards of screened gravel, and by the Department of Public Works for paving five streets with granite blocks on concrete and three streets with asphalt on present stone block pavement.

At Troy two streets are to be paved with granite blocks, one with asphalt and one with vitrified brick.

Troy will lay twenty blocks of asphalt, five blocks of vitrified brick, and eighteen blocks of granite this Summer. The work on some of the streets is already under way. It is also contemplated, and has been favorably reported, to pave Pawling Avenue (one mile) with asphalt.

Assemblyman Well's re-pavement bill has been signed by Gov. Flower. It provides that \$200,000 of bonds be issued and that Third Avenue be repaved from the Harlem River to 170th Street at Harlem.

Broadway, Greenbush, is to be paved with granite blocks.

At Ithaca considerable brick paving and macadamizing will be done this season.

Two large contracts for street paving at Buffalo have been given to the Barber Asphalt Paving Company.

There is a bill pending in the New York Legislature which provides for a State loan of \$10,000,000 for the construction and maintenance of country roads outside the towns and villages.

At Buffalo two streets are to be paved with granite. They are: Spencer Street, from Montgomery to Water Street, and Montgomery Street, from Steuben to Spencer. The contract for the former was awarded to Henry Dumary at a bid of \$2,938.00, and the latter to R. H. Strong at a bid of \$11,686.64.

ILLINOIS.—At Evanston, Maple Avenue is to be paved with cedar blocks. Several thousand feet of paving is to be laid in the business part of the city of Monmouth during the present year.

At Streator \$1,000 has been appropriated for tilling roads and \$1,000 for macadamizing North Bloomington Street.

There is a movement on foot started by the property owners on Lafayette Street, Ottawa, to curb that street and pave it with cedar blocks.

NORTH CAROLINA.—\$25,000 has been appropriated by the Board of Aldermen at Wilmington for macadamizing Red Cross Street.

INDIANA.—A large number of streets at Fort Wayne are to be improved and the Council has voted in favor of brick sidewalks for seventeen streets.

Several streets at Anderson are to be paved with brick.

KENTUCKY.—Street improvements are in operation at Danville.

G. W. Gosnell has been awarded a contract to build a boulevard from Louisville to Jacob Park, to be three miles long and forty feet wide. The cost will be \$49,000 and it will be finished by the middle of October. It is to be constructed with eight inch broken stone foundation, which is to be put down in two courses of five and three inch layers, on which foundation will be spread four inches of best Paducah gravel, and it will be rolled with a five ton roller.

LOUISVILLE.—A contract to furnish this city with 1,600,000 paving bricks at \$13 per thousand was awarded to the American Fire Clay Company, of Toronto, Ohio.

MICHIGAN.—There is a movement on foot at Ithaca to pave the streets of that city.

MINNESOTA.—Fargo is agitating to have its streets paved.

The streets of St. Cloud are to be paved.

At Duluth extensive street improvements are being carried on in every part of the city where work was left unfinished last Fall.

MINNEAPOLIS.—Canal Street from First Avenue to Muskegon Avenue is to be paved with limestone, although property owners on that street wanted it paved with cedar blocks, but the Board of Public Works recommended stone.

IOWA.—There is talk of paving the streets of Atlantic.

A number of streets in Burlington is to be paved with brick; work to be commenced at an early day.

Fort Dodge is soon to commence street paving work.

Over two miles of street paving is to be done at Clinton; the contracts have already been awarded.

Contracts have been let at Des Moines for ten miles of cement curbing, eight miles of brick paving, two miles of five foot sewers, six miles of fifteen to twenty-four inch pipe sewers, and one bridge for \$35,000.

A contract of about \$40,000 for paving brick to be used this season at Keokuk has been awarded to George Kreichbaum & Company.

A paving contract for \$74,963.97 at Davenport has been given to the Rockford Construction Company.

MARYLAND.—Hagerstown is authorized to issue bonds to the amount of \$60,000 for street improvement.

MASSACHUSETTS.—At Malden, Summer Street is to be widened from Maple to Pleasant Street, and Maple Street is to be widened from Summer to Cedar Street.

Dorchester Avenue, Boston, is to be improved, for the work of which the city has appropriated \$120,000.

A loan of \$95,000 has been recommended by the Finance Committee of Fall River, \$20,000 of which is to be used for paving purposes.

TEXAS.—At Arkansas Harbor a number of streets are being paved with shells and clay, a material somewhat like concrete.

NEW JERSEY.—Three streets of Camden are to be paved with rubble.

At Newark seven streets are to be paved with asphalt, and three with granite blocks, by order of the Board of Street Commissioners.

Bids are asked at Rivertown for 6,000 feet of crushed blue stone sidewalk, four feet wide and four inches thick.

At Jersey City bids are asked for 80,000 cubic yards of excavation and 15,000 square yards of Telford paving in the Catholic Cemetery.

\$500,000 is to be spent in street improvements this season at Newark.

Bonds to the amount of \$35,000 will be issued at Hackensack for macadamizing a number of their streets.

WISCONSIN.—At Oshkosh, Oregon and Washington Streets are being paved with Cedar blocks. At Milwaukee, National Avenue from Fifteenth to Washington Avenues, will be paved with cedar blocks. David Turner has the contract.

PENNSYLVANIA.—At Curwensville the question of brick paving is being considered by the City Council.

Broadway, Philadelphia, will probably be paved with asphalt at an early day. The street is thirteen miles long from League Island to the Montgomery County line, and is about 113 feet wide.

MONTANA.—About 2,000 feet of paving will be done on Eighth Avenue, east of Bettie Street, Helena, for which contract has been given to C. B. Garrett & Co.

OHIO.—Defiance will probably have better streets before long, as the new Council proposes to have them improved.

There is talk of laying a mile of street paving at Barnsville during the present year.

At Creston the paving and sewerage questions are receiving much attention.

At Martin's Ferry considerable paving will be done this season.

Bids are asked for grading one street in Mansfield.

New Lisbon has been granted the right by the Legislature to pave Washington Street.

A number of property owners at Lima are agitating a movement to pave Main Street.

The authorities at Dayton have adopted the Porter light colored brick, manufactured at Wheeling, W. Va., for use in improving their streets, for which Edward Ryan has the contract at \$450,000.

Canton has already a number of well paved streets and the work now being done on Market, Tuscarawas and South Cleveland Avenues, will be finished at an early day.

The people of Columbus want East Tompkins Street improved.

The Warren-Scharf Asphalt Company are now at work surfacing Eighteenth Street from Town to Rich Streets, at Columbus.

A number of streets at Springfield are to be paved this season. Among them are North Limestone Street, from the north line of Main Street to the south line of McCreight Avenue; High Street from the west line of Centre Street to the west line of Yellow Spring Street, and South Fountain Avenue, from a point thirty-six feet north of the south line of Washington Avenue to the south line of Jefferson Street.

Bids for paving are asked at Tiffin. The County Clerk is Jeremiah Rex.

Bids are asked by the City Comptroller of Dayton for cement or asphalt sidewalks.

Oakwood Avenue, Columbus, is to be paved with Trinidad asphalt, the contract for which was awarded to A. G. Pugh & Co.

OREGON.—DALLAS.—Main Street will be graded and gravelled and the work must be completed at an early day.

Laburnum Avenue, at Sunnyside, is to be improved. The street is to be graded and new sidewalks will be laid from Hawthorn Avenue to the Base Line Road.

GEORGIA.—A boulevard is to be laid from the centre of North Atlanta to the new waterworks reservoir at Atlanta.

COLORADO.—In the Capitol Hill District of Denver, twenty-five miles of streets are to be paved at a cost of about \$1,500,000.

NEBRASKA.—There is a new law at Wymore which prescribes certain distances to be observed between property lines and sidewalks in laying said sidewalks, and it provides certain regulations for planting and growing shade trees.

CONNECTICUT.—The town of Glastonbury will soon have specifications to submit for bids for macadamizing one mile of road. It is expected to build a road sixteen feet wide, to use best quality trap rock only of a thickness of eight inches at center and six inches at sides, after rolling.

CALIFORNIA.—A \$70,000 boulevard is being constructed at Santa Barbara.

At San Bernardino E Street has been paved with vitrified brick.

BRIDGES.

PENNSYLVANIA.—The Alleghany is to be bridged at Franklin.

Work is to be begun at once on a bridge to be built at Jack's Run, a short distance from Bellevue, by which the electric cars which run from Pittsburgh will reach Bellevue.

The Pennsylvania Railroad Company will construct an overhead bridge at Columbia.

An iron bridge is to be erected at Franklin over the western branch of the Canoecheague Creek, near Riders Mill.

MICHIGAN.—A \$5,000 iron bridge will be built across Cedar River at Putnam Street, Williams-town.

Saginaw is to issue bonds for \$200,000 for the erection of two bridges.

The citizens of Marinetta are agitating for the construction of a bridge across the Menominee River near Wallace. They hold that it will be of great benefit to the farmers of that vicinity.

WASHINGTON.—At Everett a bridge is to be erected over the Snohomish River at a cost of \$10,000.

The Edison Illuminating Company has offered to light with twelve arc lights, free of charge, the Monroe Street Bridge at Spokane, when it shall have been completed.

One of the most gigantic of steel bridges will be that across the Columbia River at Vancouver. There will be 200 feet clear opening on each side of the draw pier.

KANSAS.—Three bridges will be built across the new ditches at Grantville, contracts for which are let.

NEW YORK.—**BUFFALO.**—A wrought iron bridge is to be built over the Buffalo River on Bailey Avenue.

It is proposed to build six large steel bridges across the Harlem River, to cost about \$13,000,000.

There is a bill before the New York Legislature which will authorize the issuance of bonds in the city of Rochester for the construction of three bridges across the Genesee River.

A bridge is to be built at Rochester, at Mortimer Street, and another at Andrew Street. Full information can be had by application to the Chairman of Public Works.

DELAWARE.—The city of Wilmington is authorized to issue bonds for \$5,000 to build a bridge over the Brandywine.

MASSACHUSETTS.—A committee has been appointed at Blackstone to get plans and receive bids for an \$18,000 stone bridge to replace the one burned a short time ago. The committee consists of Cornelius Day, Patrick Kennedy and William A. Power.

CONNECTICUT.—At Suffield a company, to be known as the Suffield-Thompsonville Bridge Company, has been organized for the purpose of constructing a bridge over the river between Thompsonville and Suffield. Information can be had by applying to Charles D. Woodworth, of Suffield.

SEWERS.

RHODE ISLAND.—Resolutions have been passed by the Board of Aldermen for sewers in six streets.

NEW JERSEY.—Bids are asked by the Street Commissioner of Elizabeth for sewers in two streets.

NEWARK.—Twelve inch pipe sewers are to be constructed in three streets, 15 inch in two streets, 18 inch in one street, and a 30x20 inch brick sewer in two streets.

MARYLAND.—City of Hagerstown will issue bonds for \$40,000 for sewers and streets.

Bids are asked by the City Commissioner of Baltimore for the materials for three sewers.

PENNSYLVANIA.—At Wilkinsburg the citizens have voted in favor of the issuance of bonds to the amount of \$160,000 for proposed sewers.

Bids are asked at Oil City for two sewers.

The town of Kittanning will issue bonds for \$30,000 for a sewerage system.

OHIO.—Bids are asked for several sewers at Youngstown.

A committee has been appointed at Cleveland to consider the matter of the proposed 7 foot sewer in Doan Street from Euclid Avenue to the lake, which will pass through Glenville.

C. A. Hirbig, City Comptroller at Dayton, asks bids for 710 feet of 42 inch and 170 feet of 30 inch brick sewer.

The Director of Public Works of Cleveland asks bids for sewers in four streets.

Bids are asked at Columbus for brick and pipe sewers.

MASSACHUSETTS.—At Fitchburg a system of sewers is to be constructed at East Fitchburg district.

At Melrose a committee has been appointed in conjunction with the Board of Selectmen to investigate the question of sewerage and report at the fall meeting.

City Engineer of Haverhill has prepared plans for two systems of sewers for the districts about Walnut and Dustin Squares.

The council of Somerville has voted in favor of borrowing \$10,000 for sewers.

It has been decided by the Committee on Sewers of Worcester to build ten new tanks at the purification works at Quinsigamond to cost about \$80,000.

NEW YORK.—Bonds to the amount of about \$10,000 have been voted by the village of Tarrytown to complete the sewerage system.

The City Engineer of Buffalo is at work on plans for sewers for Kensington.

The citizens of Olean have voted in favor of \$35,000 appropriation for the construction of outlet sewers.

CONNECTICUT.—The Sewerage Committee of Meriden asks proposals for constructing about four miles of outlet sewers from 18 to 36 inches diameter with appurtenances, and an inverted syphon 2,100 feet long and the construction of disposal grounds.

Sealed proposals are asked and will be received by the Warden and Burgesses of the Borough of Torrington for construction of sewers, etc., in Forest, North Maine, Clark, Prospect, George, Albert, and Pearl Streets; also an outfall sewer. Each proposal must be accompanied by a certified check for \$500.

BORROWED WIT



A PIOUS HOPE.

Two farmers met and were agreed
The weather was enchanting.
Said one: "The earth will raise with speed
All things that we've been planting."
"I hope not so!" the other said,
"I were most wretched then, sir.
You see, my wife, who now is dead,
Would rise and live again, sir."—*N. Y. World.*

"MERCY!" cried Juliet, "this glove is tight."

"I, too, should be intoxicated," rapturously responded Romeo, "were I a glove upon that hand."—*Harper's Bazar.*

A SHORTHAND REPORT.

Helen—"What did papa say when you told him we wanted to get married?"

"I wouldn't like to tell you, but if the recording angel took down the remarks verbatim he must be an expert stenographer."
—*Spokesman.*

IN BOSTON.

Street-car Conductor—How old are you, my little girl?

Little Girl—If the corporation doesn't object, I'd prefer to pay full fare and to keep my own statistics.—*Puck.*

HOW TO SEE BEAR.

Sportsman—Are there any bears in these woods?

Maine Man—Thousands.

Sportsman—Well, I've been hunting for bear for six weeks now, and haven't seen one yet.

"Would ye like to see some—a hundred or so?"

"Indeed I would."

"Stop huntin' an go fishin'."—*New York Weekly.*

A LENTEN OFFERING.

Cinch—What have you given up for Lent?

Pinch—Thirty dollars for my wife's Easter bonnet.—*Puck.*

COULDN'T TRUST HIM.

Miss Gush—And, Ethel dear, what is the baby's name?

Mrs. Newmother—I've named him Ethelbert Algernon.

Miss Gush—But I always thought the father named the boys?

Mrs. Newmother—If you could hear what his father calls him when he is walking the floor with him in the early dawn, you wouldn't wonder I took matters in my own hands.—*Cincinnati Spokesman.*

THREE MAIDENS.

Three maidens went shopping out in the West—
West Twenty-third—when the sun went down.
Each thought of the color that suited her best

For a new Spring hat or a dancing gown,
And had it sent home on the morrow.

And each for the man she loved did buy

A wild and terrible patterned tie
That each man wore in sorrow.

For women must buy and men must wear,
Though the style is enough to curl one's hair,
Or trouble dire to borrow.—*N. Y. Herald.*

A TRAMP may be awfully lazy, no doubt,
Yet when he's confined in a jail
He'll work like a beaver to dig himself out
With only a ten-penny nail.—*Puck.*

"I SEE you are advertising again for a runaway dog. This is the third time in a single month."

"Yes, bother it! Since my daughter has begun taking music lessons I can't keep a dog in the house."—*London Til Bits.*

MRS. CHERRITRY—I hope you will never whip Dick again for lying, so long as you live.

Mr. Washington Cherritry—What's the matter now?

Mrs. Cherritry—Lizzie asked him if he didn't think her baby was pretty, and he said, "No, Aunt Lizzie, I think he is very plain-looking."—*Puck.*

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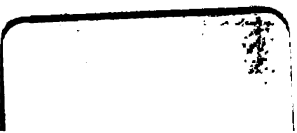
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